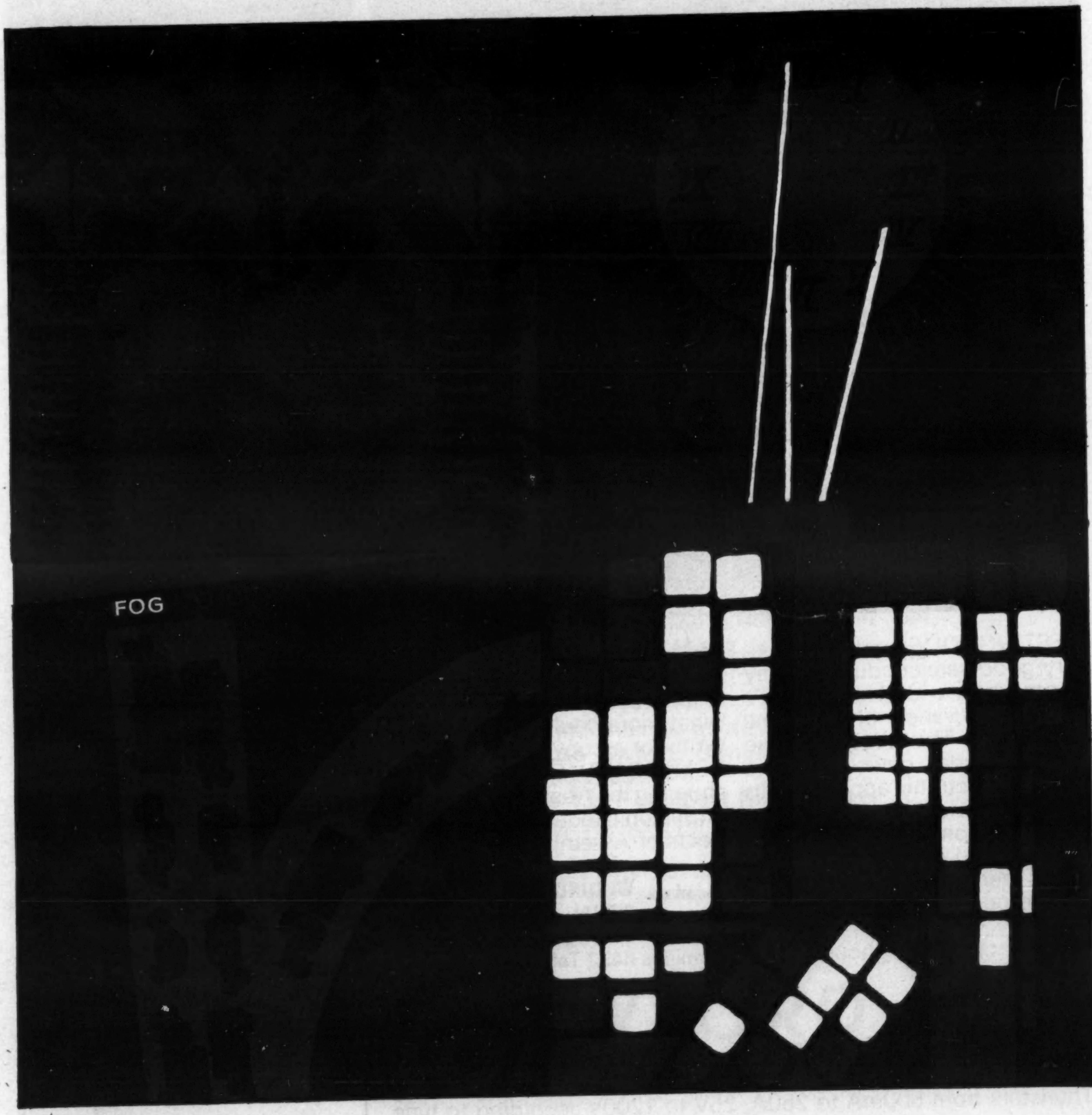
11 MARCH 1966 *BOARD OF TRADE JOURNAL*

ELECTRICAL ENGINEERS EXHIBITION GUIDE



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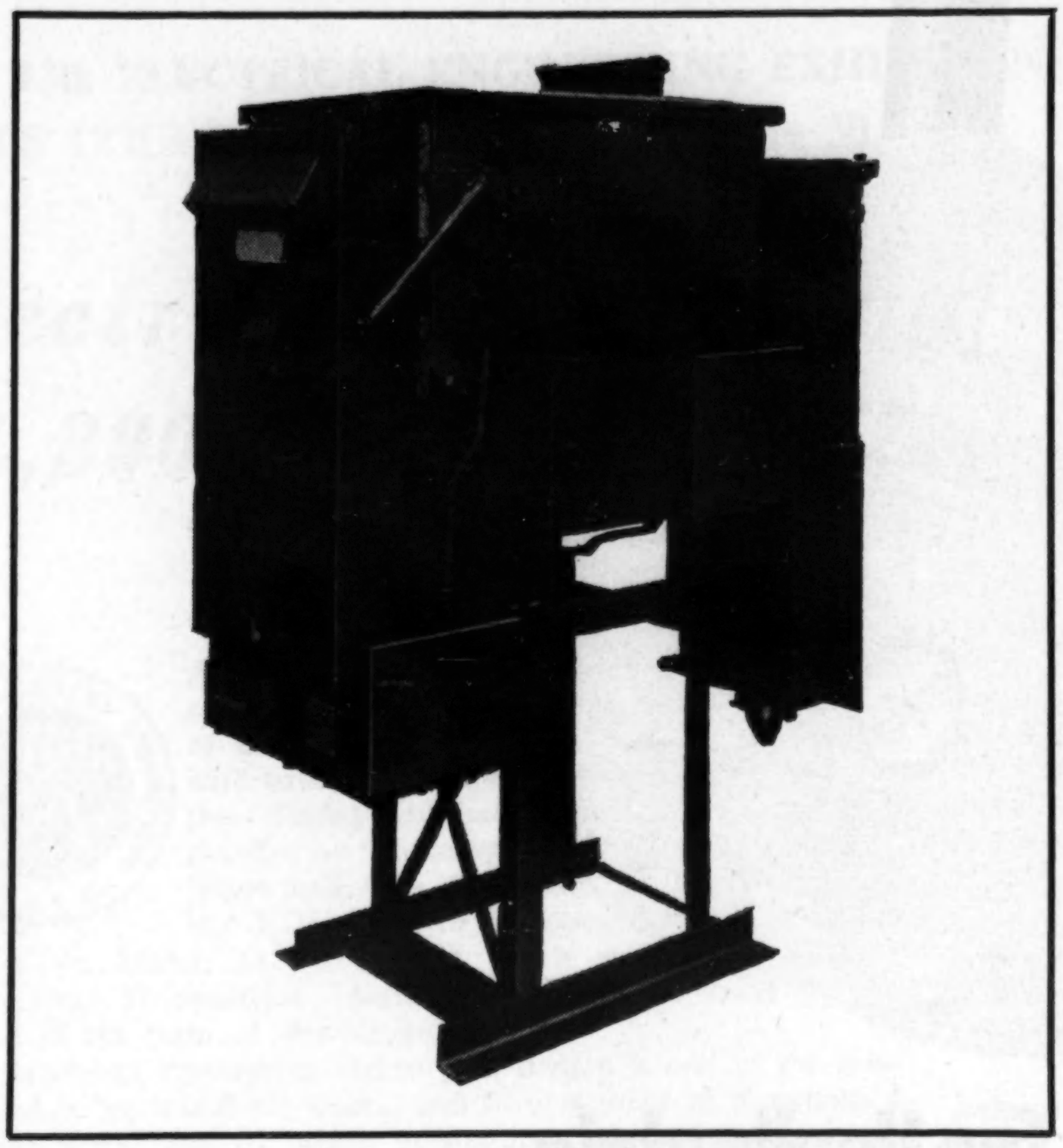

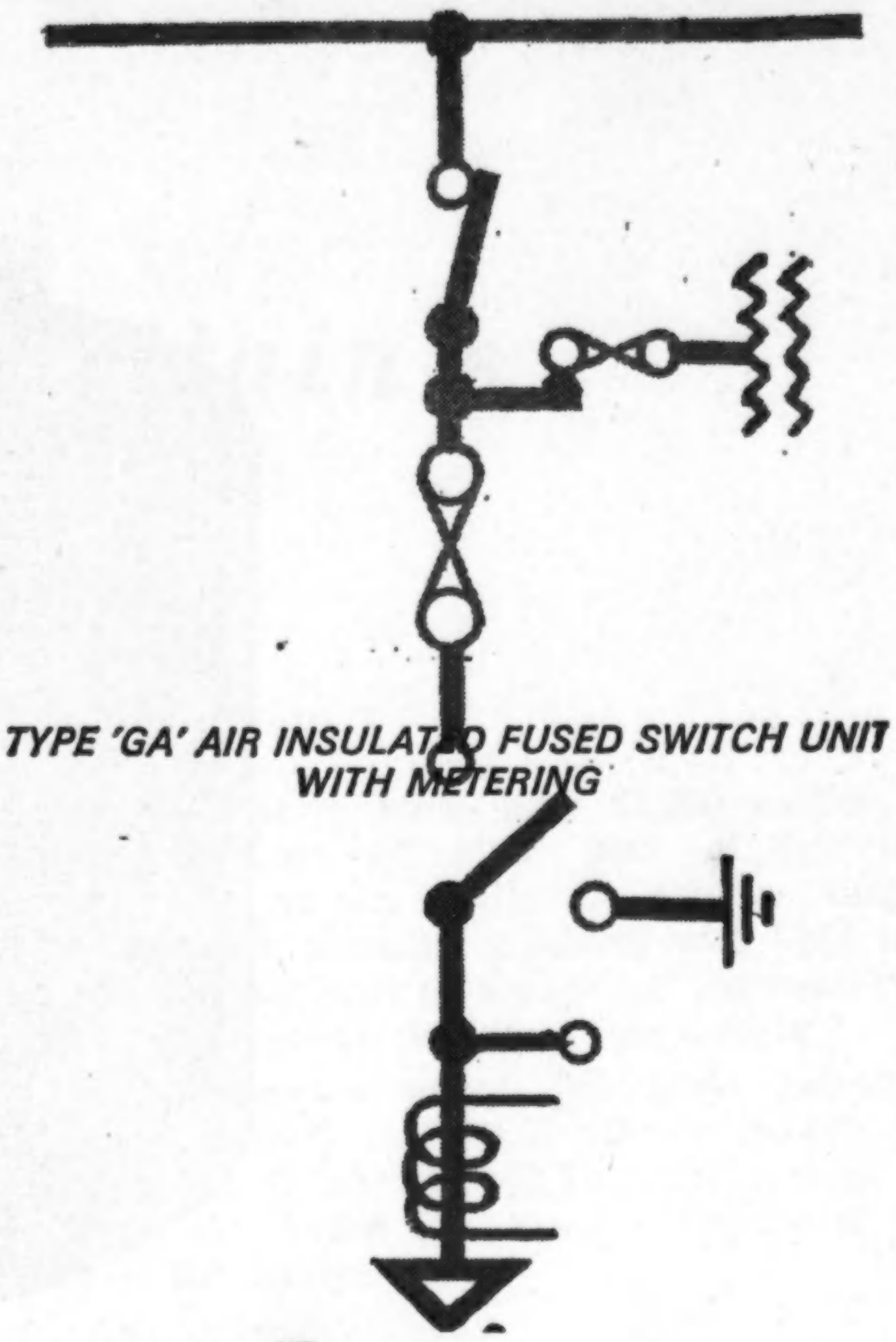

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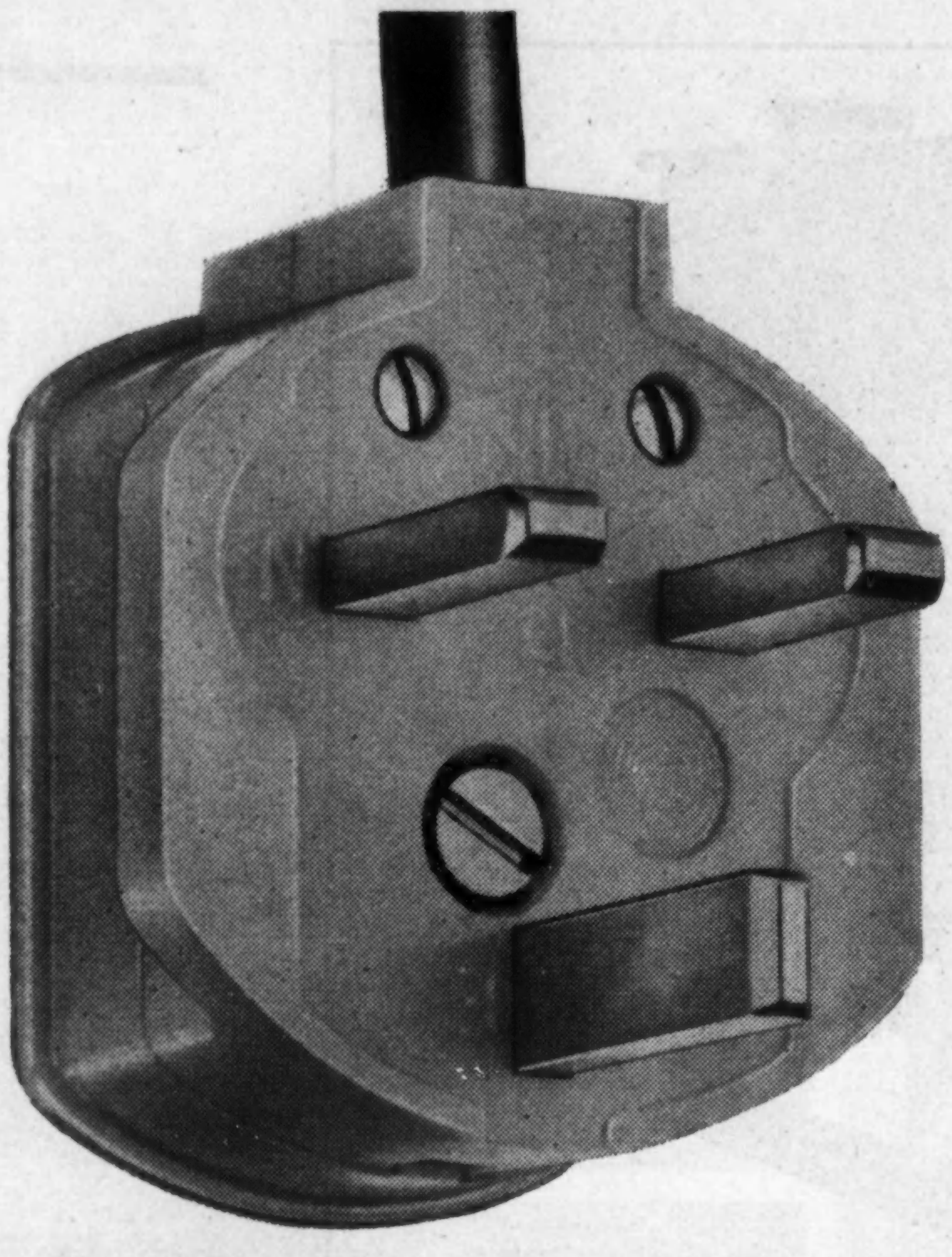

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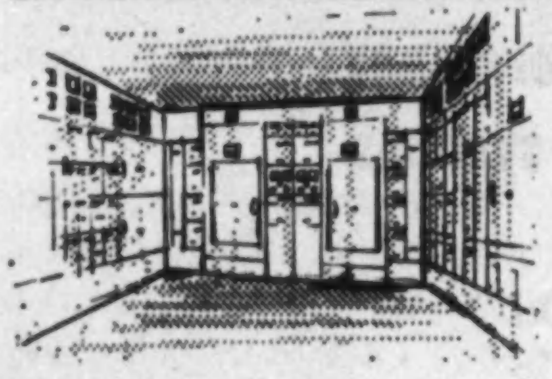

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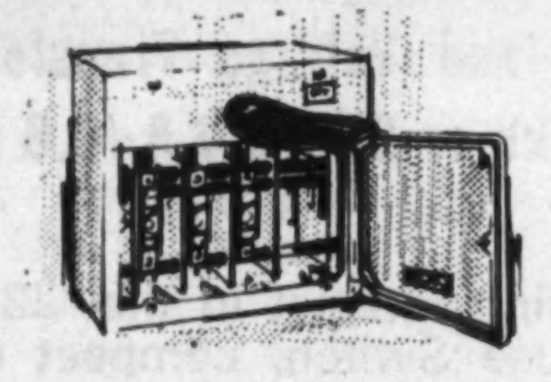

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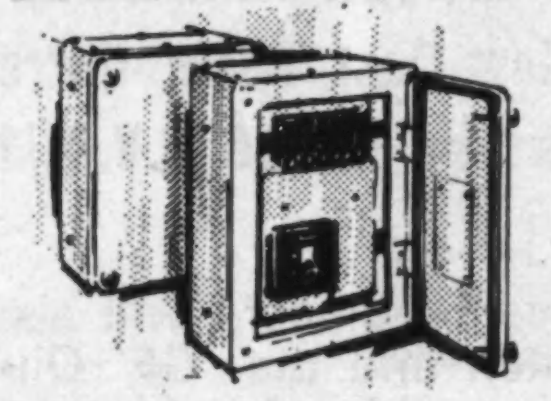

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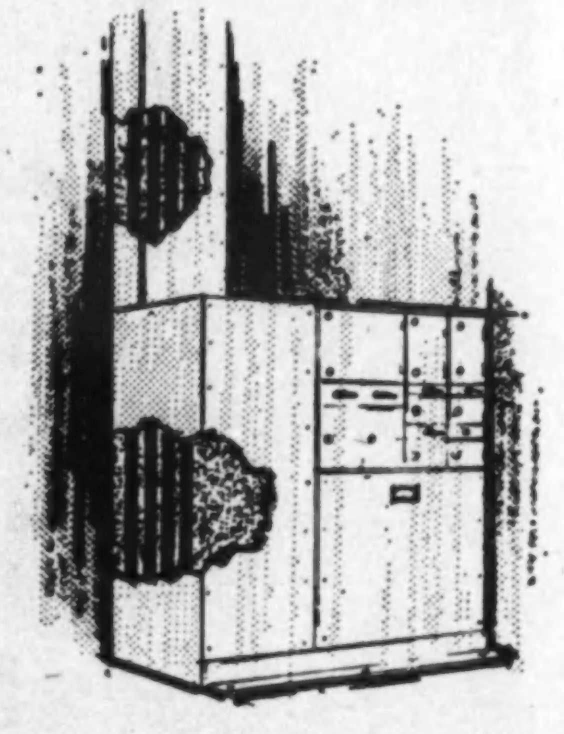

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THE 13th ELECTRICAL ENGINEERING EXHIBITION
EARLS COURT, LONDON, MARCH 23 to 30

Electrical Engineering — Britain's £1,300 million industry

AN EXHIBITION concerned with a major industry must inevitably invite comparison with the tip of an iceberg – only one tenth of the subject with which the exhibition is concerned shows on the display surface, nine-tenths being too massive or too complex to bring into any exhibition hall. The Thirteenth Electrical Engineering Exhibition, to be opened at Earls Court, London, on March 23, 1966 – and which will be attended by visitors from 57 countries – forms a particularly striking demonstration of the truth of this simile.

The electrical engineering industry in Britain is one of the most advanced to be found anywhere, and in a number of directions it leads the world. But its prime, outstanding achievements are concerned mainly with large-scale conventional (coal- or oil-fired) and nuclear generating plants, pumped storage hydro-electric stations, the largest grid system in the world, covering the whole country, and one of the greatest railway electrification schemes ever undertaken.

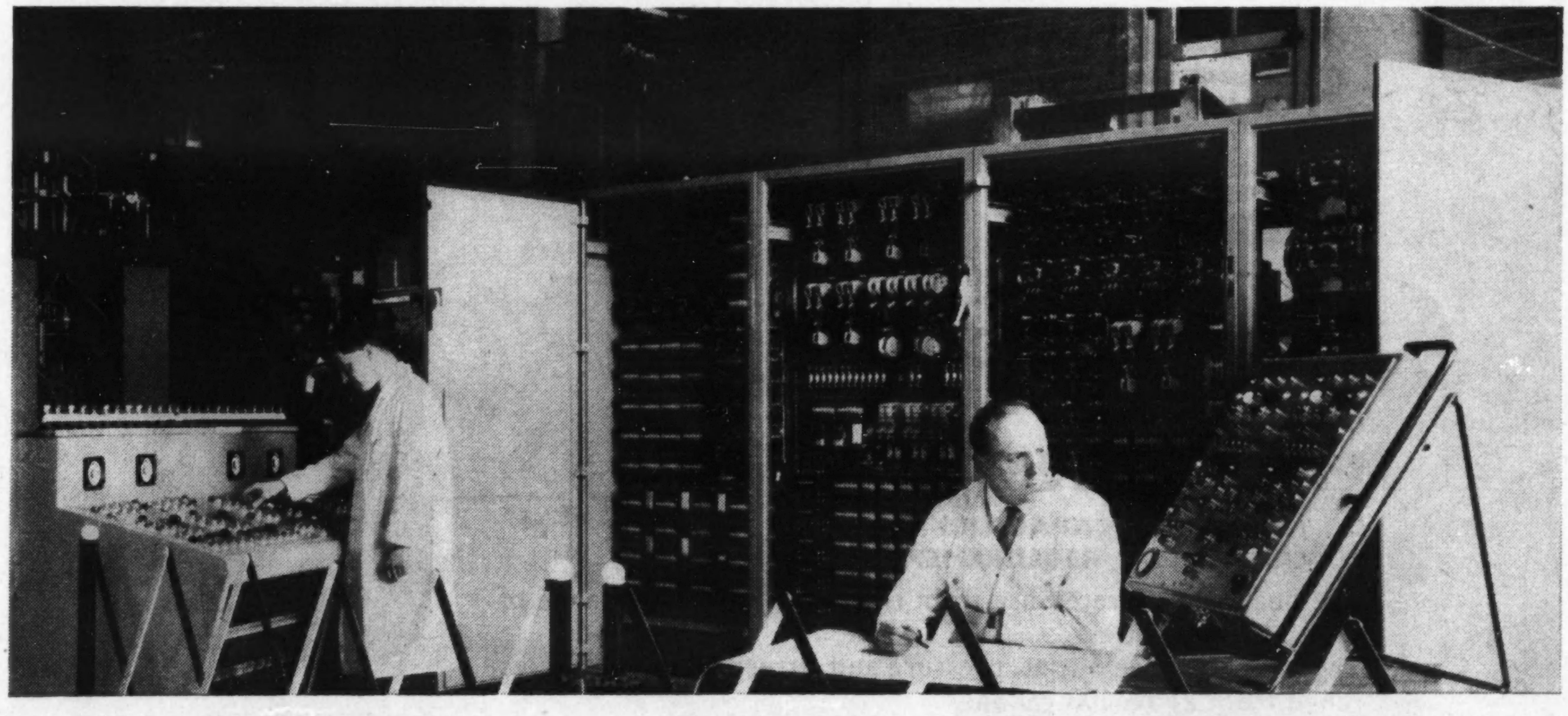
The electrical industry in Britain employs three quarters of a million people in manufacturing alone, and the output of the industry last year was worth more than £1,300 million. These figures indicate the scale of that part of the industry which cannot be shown at any exhibition, however large. The 500 stands at Earls Court, although glittering with light reflected from the polished metal surfaces of a hundred thousand intricate components, can only represent the tip of the iceberg.

Nevertheless the representatives of this great industry, the second largest export industry in Britain, with an export turnover last year of well over £350 million, will be able to assist visitors to the exhibition to delve below the attractive surface of the displays, and see what lies behind.

Achievements in nuclear power

Discerning visitors—and the exhibition is intended only for them, since the general public is not invited—will, for example, soon begin to sense immense achievement in the nuclear power field.

Starting the first 5,000,000 kilowatt atomic power programme in 1955, when consent was given for the establishment of the first two power stations to be built anywhere in the world on a major



These controls for a plano milling machine under test at the Bedford works of Brookhirst Igranic are the combined product of four MI Group companies. The complete equipment, ordered by Noble and Lund, will control a multi-purpose plano miller having four 50-h.p. cutting heads, four tool incremental feeds, a 20-h.p. variable speed table motor, four 5-h.p. variable speed milling head feed motors and auxiliaries. The motors were produced by Lancashire Dynamo & Crypto, the digital feed control system by Lancashire Dynamo Electronic Products and five variable speed magnetic amplifiers were supplied by Lancashire Dynamo Myelin.

The busbar chamber of what is claimed to be the world's first 66 kV packaged sub-station in the course of construction at the Caerphilly works of South Wales Switchgear Limited.

commercial scale, the programme gathered momentum as construction was started on further stations, and in 1961 world wide interest was aroused when Berkeley and Bradwell came into commission, bringing 575,000 kilowatts of nuclear plant into service on the British electricity supply system.

By now, in 1966, all but two of the stations in that first nuclear programme are at work, and Britain has generated more electricity from nuclear sources than in the rest of the world put together.

But the most significant feature of the programme is that the capital cost has fallen progressively from £186 per kilowatt sent out from the first nuclear station, down to £100 per kilowatt for the most recent plant. Moreover, the Dungeness B station, the first of the new programme of 8,000,000 kilowatts of nuclear plant, will undoubtedly generate power more cheaply than is possible at the most efficient conventional coal- or oil-fired power stations operating under British conditions.

It is equally impossible to show, at any exhibition, the 500,000 kilowatt single-shaft generators that are now beginning to become the standard equipment in the conventional power stations in Britain.

The world's largest power network

Perhaps it is not always realized that the British power system is the largest electrical power network under single, unified control that exists anywhere in the world. As Mr. F. H. S. Brown, chairman of the Electricity Generating Board, said recently: 'The power density in this country exceeds that, for instance, in America by a factor of about 10, being above 500 kilowatts per square mile in the United Kingdom, as against less than 50 kilowatts per square mile in the United States.'

This has meant that the British power transmission network – the national grid system – is extremely highly stressed, because the basis on which the British system is operated is to allow the power stations with the cheapest cost per unit of output to generate most power, wherever they may be. In consequence the grid

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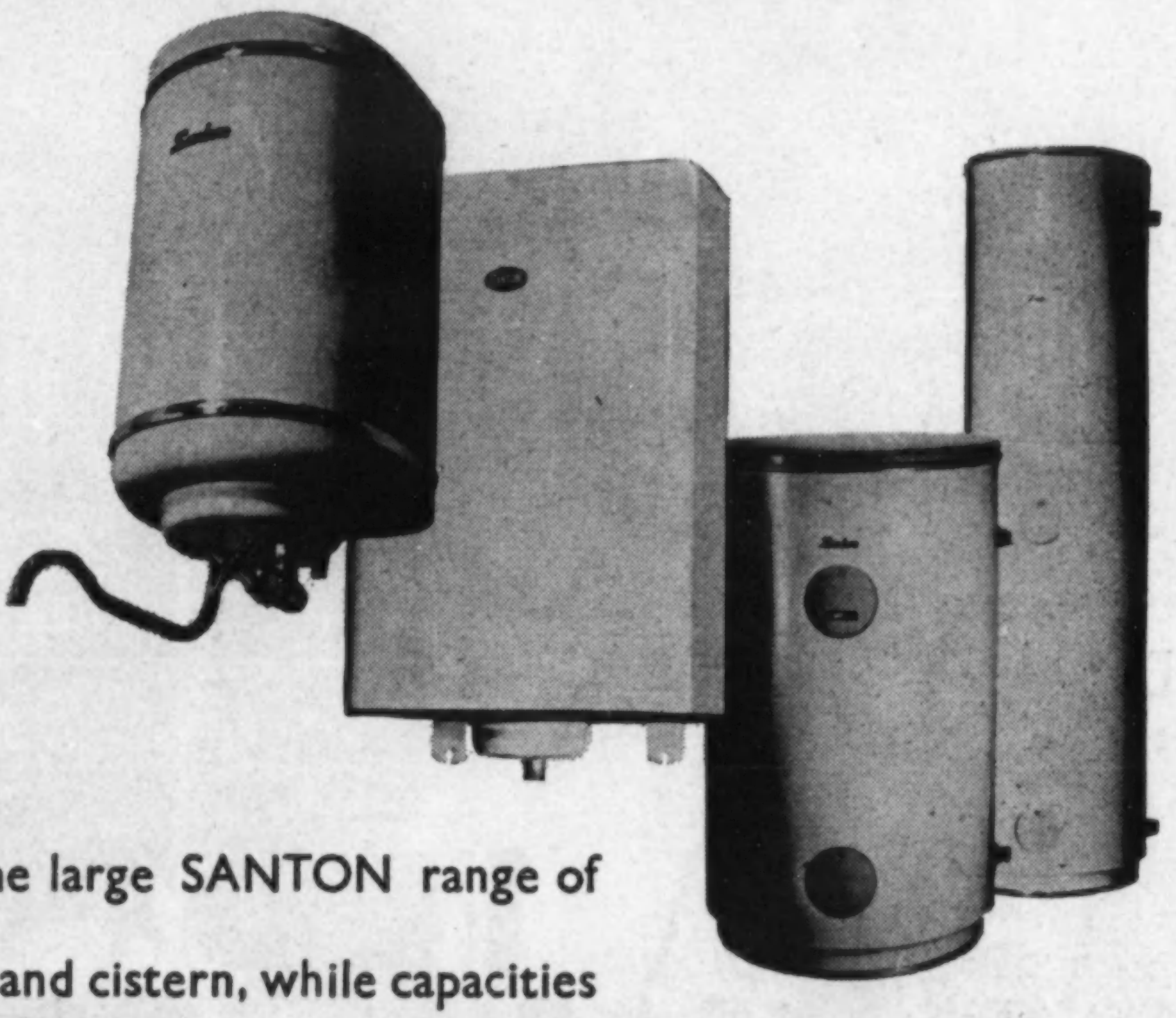

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network may have to transmit enormous amounts of power across the country, even though no very great distances are involved, at any rate by comparison with Russia, Sweden and other countries.

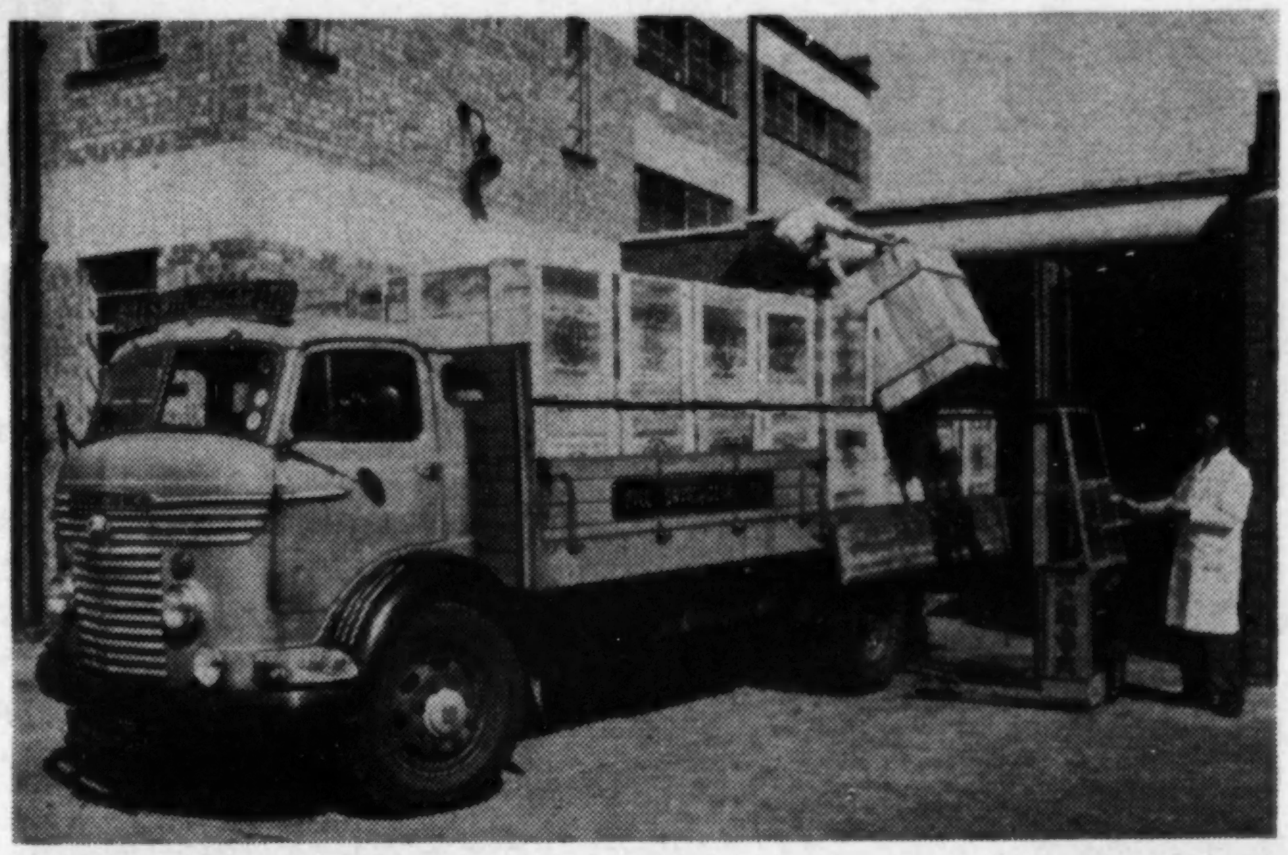
To strengthen the power transfer capacity still further, the voltage of 400,000 volts is now replacing the previous level of 275,000 volts, and the system is such that the overhead power lines, in which two separate power transfer circuits are carried on the same pylon, have a capacity of 3,600,000 kilowatts, the largest overhead line capacity to be found anywhere. These pylons, 164 feet high and carrying 25 steel-cored aluminium conductors, cannot be brought into the exhibition, although all their rigorously tested components can be displayed in detail.

Circuit breakers

Because the grid system must be protected against widespread damage or failure of supply caused by some incident taking place on any part of the system, the switches, called circuit breakers, that automatically isolate any section if trouble occurs have to have a power rupturing capacity greater than that found anywhere in the world. The circuit breakers used on the British 400,000 volt grid have to interrupt 60,000 amperes, or 35 million kilowatts.

At the exhibition at Earls Court there will be seen a striking example of this type of circuit-breaking equipment. The principle on which these devices operate is that of 'blowing out' the enormous arc that is caused when a high power electric circuit is interrupted. In the forecourt of Earls Court there will be shown one of the three similar assemblies that make up a 400,000 volt air-blast circuit breaker. This component is 23 feet high, and weighs 19 tons. To mitigate the effects of the British climate on outdoor electrical plant, circuit breakers of this kind are being installed, in some cases, in indoor sub-stations, for the first time in the world.

All the electrical power generating and power distribution plant used in Britain is made in Britain, and visitors to the exhibition will see at every turn the influence that the very large British system has on the plant in use. The duty on every single item of plant is extremely severe, but to compensate for this, there is an almost unique feature of British electrical engineering in that the nationalized power system authorities have extremely close collaboration with the manufacturers, and feed back to them detailed service experience of observing the behaviour of their designs in practice, and of continually effecting improvements.



A consignment of switchgear from the Aston Lane, Birmingham, factory of Bill Switchgear Ltd. being loaded for transportation to the docks for shipment to Kuwait.

The very large research establishments run by the nationalized power authorities, which do not have any parallel anywhere else in the world, also place their experience at the benefit of

(*Continued on page ix*)

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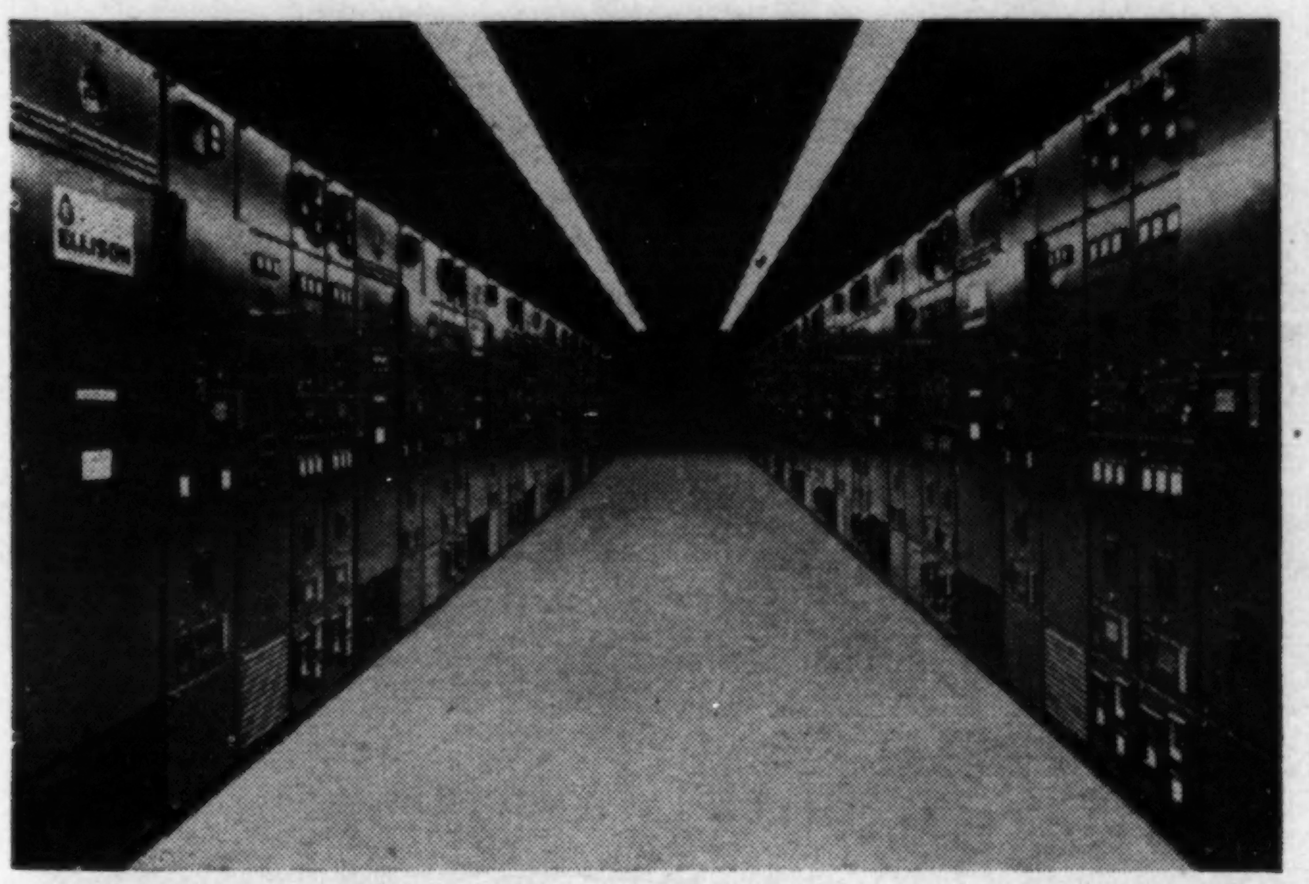


To control the electrical load requirements for their new factory extensions, this large medium-voltage packaged sub-station was recently installed at the Doncaster Works of ICI Fibres Ltd. Rated at 12 mVA, the packaged sub-station was designed and built by George Ellison Ltd., Birmingham, and is believed to be the largest of its type yet installed in Europe.

An operator feeds instructions into an ARCH computing system supplied by Elliott-Automation to the Velindre tinplate works of the Steel Company of Wales. This is one of two identical ARCH computing systems which SCOW are using for 'on-line' quality control of high-speed continuous tin strip production, the other being in operation at their Trostre works.

the manufacturers, and the overseas customers who may buy plant from Britain get the benefit of this unique testing ground. Again, this is something that cannot be displayed like a new washing machine or a small industrial motor, but the influence of the feed-back of service experience can easily be detected by the knowledgeable expert visitor.

An example of the way in which this collaboration between user and manufacturer is put to work can be seen in the very large transformers needed to stepdown the transmission voltage to a suitable value for local use. As these unts get larger, transport problems intervene in every country in the world.

In Britain, in particular, there are problems about rail transport, as the size of transformer reaches the maximum permitted on British Railways. In other countries, the problem may hinge on the capacity of road bridges, or perhaps on the handling capabilities of cranes at small harbours.

The world's first transformer design that can be completely erected and given the lengthy and rigorous testing (necessary for acceptance on any major power system) in the factory of the maker, and then dismantled for transport, with its vital parts completely sealed against the intrusion of the atmosphere, has been produced in Britain. Models and diagrams will illustrate how this process can be safely carried out, with the transformer erected again on site and its sealed winding and internal parts put to work without any problems arising through this new form of site erection.

No manufacturer could embark on a major programme of this kind, involving perhaps half a million pounds, without the closest collaboration with the user, and without the certainty that the plant will be purchased and used. The Central Electricity Generating Board has already brought some of these units successfully into service.

Turning away from power supply, the exhibition will show, this year more strongly than ever, that British manufacturers are becoming very fully aware of the needs of other countries. For example, the International Electrotechnical Commission has been evolving international standard specifications and dimensions, and many industrial items (such as motors) will be found at the exhibition to have been so arranged that they are acceptable in many countries, not only in regard to their dimensions but also in regard to the tests that each country imposes to ensure that the equipment will carry out its required duty.

New electronic techniques

The newest electronic techniques are sweeping into the power side of electrical engineering. In this field, the exhibitors will be able to show actual examples, for instance the complex control equipment needed for automation of every type of industry. Many types of this kind of apparatus will be seen at the exhibition.

To mention one particularly interesting example of electronic techniques applied in the power field, the old problem of speed control of electric motors, which until recently had never been solved to the complete satisfaction of the price-conscious purchaser, has now in effect disappeared, due to the development of the thyristor – a device that might be called the power version of the transistor. By its aid complete control of motor speed can be effected over a continuous range from stop to full speed, and extreme accuracy of speed regulation is easy to attain.

An alert industry

All in all, the exhibition, in spite of its iceberg-tip problem, will show that British electrical engineering industry is alert and alive to every development in the electrical world, with whatever country a comparison is sought.

Whether it be large drives for such industrial processes as rolling mills, or railway electrification schemes – and here it may be mentioned that the busiest railway route in the world, between London and Manchester and Liverpool, has recently been electrified as part of a £1,200 million electrification programme – or whether it be a question of the use of computers to control machine tools through the medium of complex electronic equipment, there is evidence to be found that the manufacturers in this country are fully aware of the user's requirements. Moreover they are able to manufacture competitively the equipment needed by their customers at home and abroad.

Above all, the manufacturers are willing and able to take, from the extraordinarily wide research panorama to be seen in Britain, the scientific results produced in the laboratory and to turn them into practical developments for use in every kind of industry, whether it exists in Britain or in other countries.

But still the visitor must always bear in mind, when inspecting an exhibition concerning large scale equipment – power stations, rolling mill drives, electrified railways – that he is but looking at the tip of the iceberg.

Make light . . .

MAKE LIGHT. That's what electrical engineers are expected to do, and now they are doing it better than ever. These words *Fiat Lux* are carved in stone over more than one old power station door. But at the Electrical Engineers' (ASEE) Exhibition it will be seen that engineers are increasing their mastery over light.

The *impact* value of light will become apparent immediately the exhibition is entered, as the visitor is exhilarated by the 'Reception of Light', warmed in the 'Hall of Light' on the first floor and welcomed in the 'Town of Light' on the second floor. In these three areas the visitor will observe how the whole architectural character of a space is completely conditioned by cunningly manipulated light, borrowing perhaps from the stage.

Detailed observation of the display areas will soon show how the electrical engineer, aided by the research scientist, can now place in the hands of the architect and the builder and indeed anyone of sensibility who appreciates the contribution light can make to civilized living, the widest possible range of lighting tools.

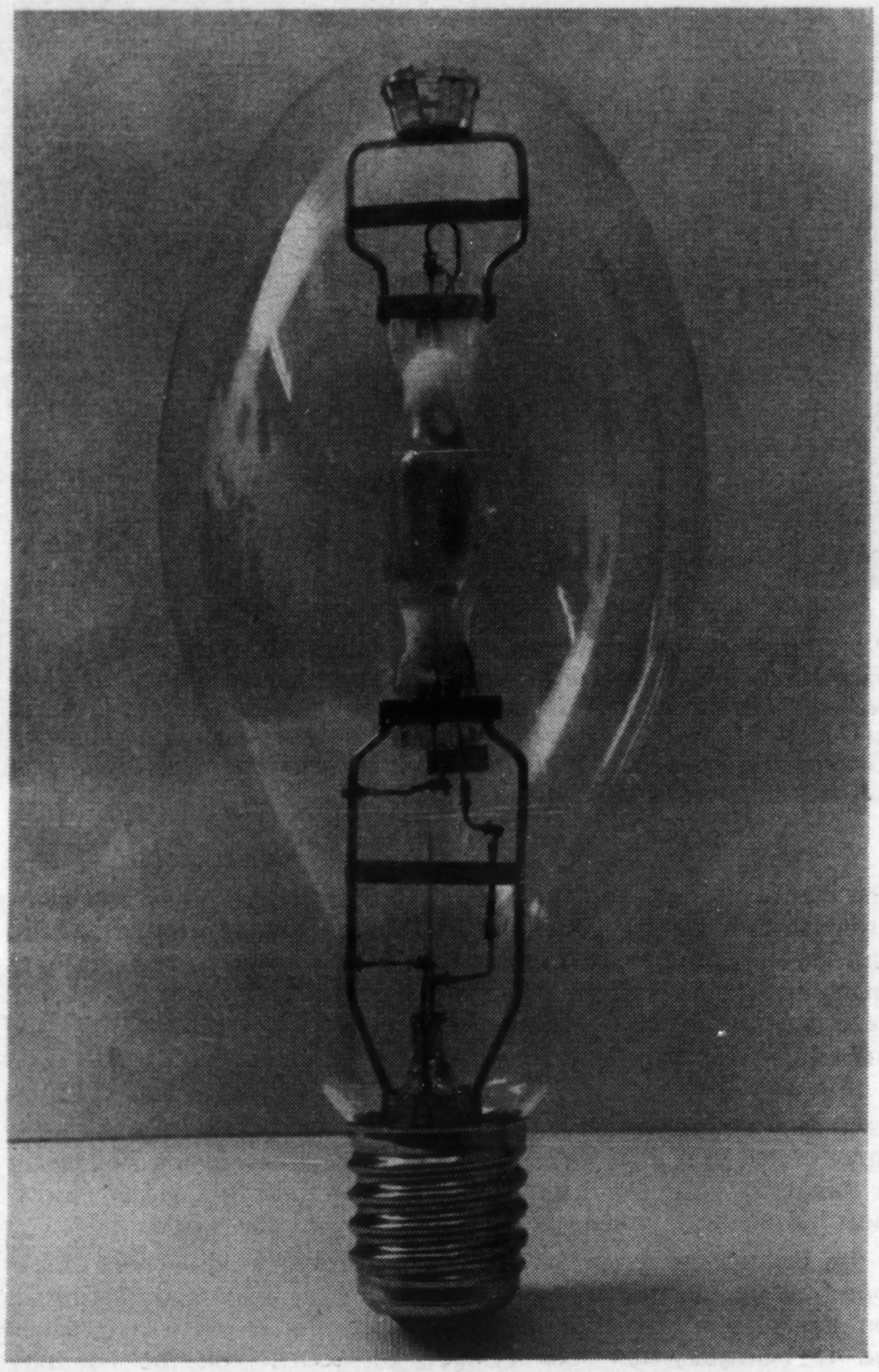
Take for example, the fluorescent tube, with its immense power of packing intense, but glareless light into the smallest possible compass. The Atlas Lighting Company's exhibits will show the lighting designer how he can tuck incredibly slender lamp-carrying spines into cornices and slits and into every sort of vertical and horizontal space, to direct powerful light or diffused light or tinted light or coloured light wherever the designer wishes. Once the spine has been installed, the lamps can be changed with the greatest ease, and can be moved to give exact light distribution.

The Simplex Electric Company's lighting fittings form another example of the eagerness of the electrical engineer to meet the wishes of the architect or lighting designer. Scientifically-designed prismatic lens-like components, in polystyrene, enable overhead fluorescent lighting fittings to give an exactly controlled distribution of light on the area below. If the designer desires, for artistic reasons, not to conceal but rather to make a feature of domestic interior lighting, he has available to him the Haloline range of circular fluorescent lamps.

Electrical engineers engaged in the lighting field have significantly progressed in two other directions.

First there is the *control* of light. The transistor only emerged from the laboratory a decade ago, and its 'big brother', the thyristor, has been commercially available for no more than five years. The perfectly smooth control of light, from complete darkness to full brilliance, provided in a small, easily-housed device incorporating the thyristor, is demonstrated on several stands at the exhibition, but in particular the approach to the 'Town of Light' on the second floor at Earls Court will show how thyristor and other lighting controls have progressed.

For example, the Peninsular Hotel, in Hong Kong, has a remarkable ornate ceiling in its lounge. The 96 500-watt lamps of the latest tungsten-iodine type, can be dimmed by means of a small, simple thyristor unit, made and shown by Atlas Lighting Ltd.



Mazda 400 watt Metalarc lamp.

The second direction in which the electrical engineer will show the lighting expert how he has progressed relates to outdoor lighting equipment and equipment for providing light in special areas e.g., those in which explosion risks may be expected.

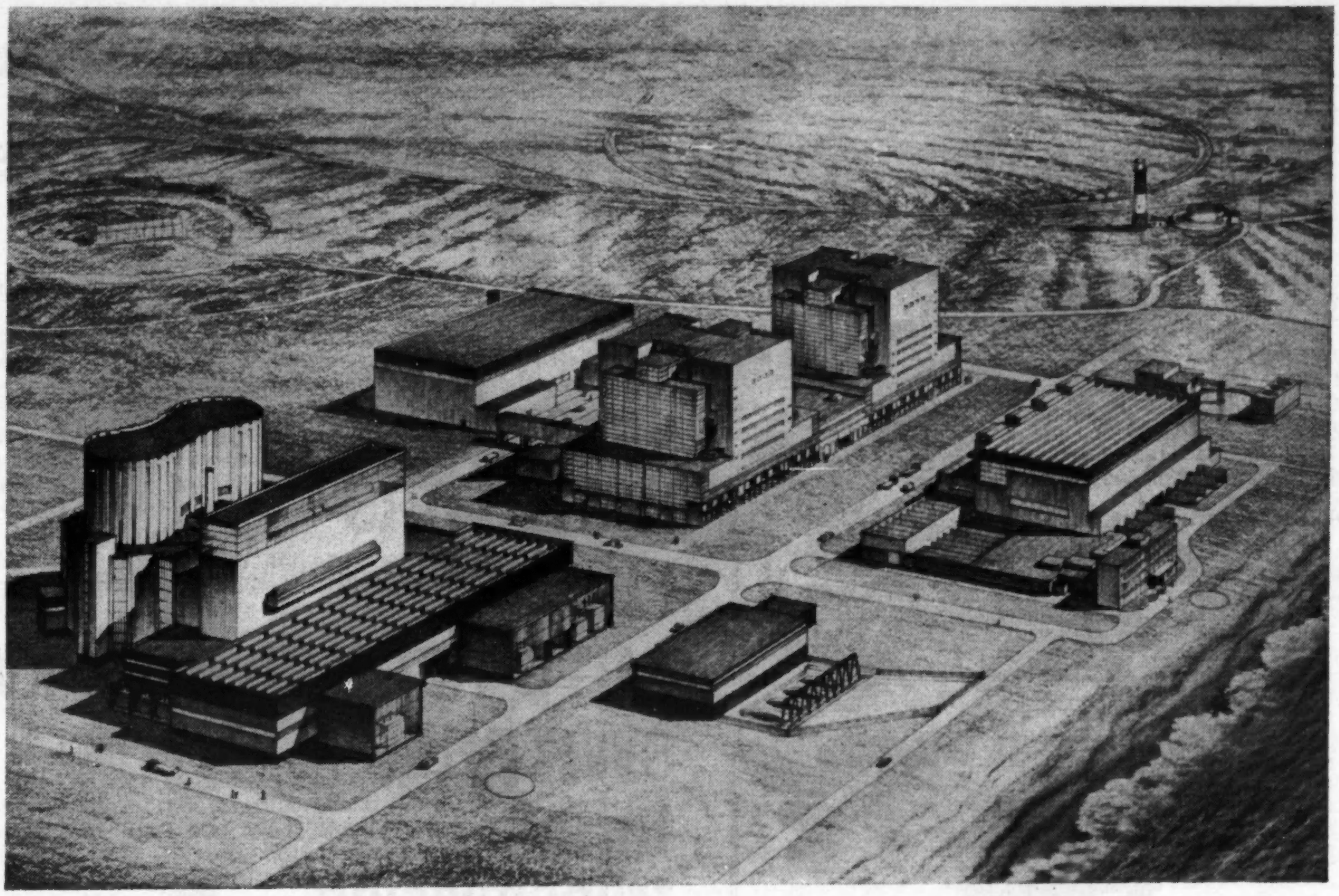
Allied to this development is the appearance of more and more lighting fittings designed to give completely trouble-free service outdoors, under all possible weather conditions. Prominent in this field are Victor Products (Wallsend) Ltd., and the AEI Lamp and Lighting Company. Dust-proof, vapour-proof, flame-proof and weather-proof qualities are all included in the fittings. Corrosion resistant glass fibre components are used when appropriate.

High tower lighting is becoming more widely used each year, for example in football grounds and transport marshalling areas. Osram (GEC) Ltd. are showing blended tungsten lamps and mercury discharge lamp installations of this type that will give corrected light closely approximated to daylight over wide areas.

The *generation* of light, with new light sources; the *control* of light, either by electrical means working on the light source or by optical means that bend the light to where it is wanted; and the *maintenance* of the light, uninterrupted over long periods under hazardous conditions; these are the three predominant features to be observed at this brilliantly-lit Electrical Engineers' Exhibition.

VISUAL AID TO MOTORWAY HAZARDS

ONE OF THE interesting new exhibits – illustrated by a model – included in the exhibition's special Halls of Light feature could have far-reaching influences in saving lives, by helping to combat such motorway hazards as accidents and fog. The exhibit is a remote-controlled visual indicator system, which allows traffic authorities to flash up to 10 messages along the entire length of the M1 by simply telephoning police central control. Police who saw a trial unit in action, were enthusiastic about its potential.



An artist's impression of the two nuclear power stations at Dungeness in Kent

POWER PROGRESS

The C.E.G.B. display at this year's Electrical Engineers' Exhibition shows the technical progress made in the race to keep up with the ever-increasing demand for electricity. The highest total supplied so far this year was 33,362,000 kilowatts on Wednesday 19th January but the total output capacity of power stations in England and Wales planned for the winter of 1969-70 is 53 million kilowatts. This means increasing the present amount of generating plant by more than 50 per cent in less than five years.

Also on show are models of Eggborough coal-fired, Pembroke oil-fired and Dungeness 'A' and 'B' nuclear power stations and nuclear fuel elements. An animated diagram explains the working of the Ffestiniog pumped storage scheme in Merionethshire.

SEE THE LATEST ON POWER AT STAND B3

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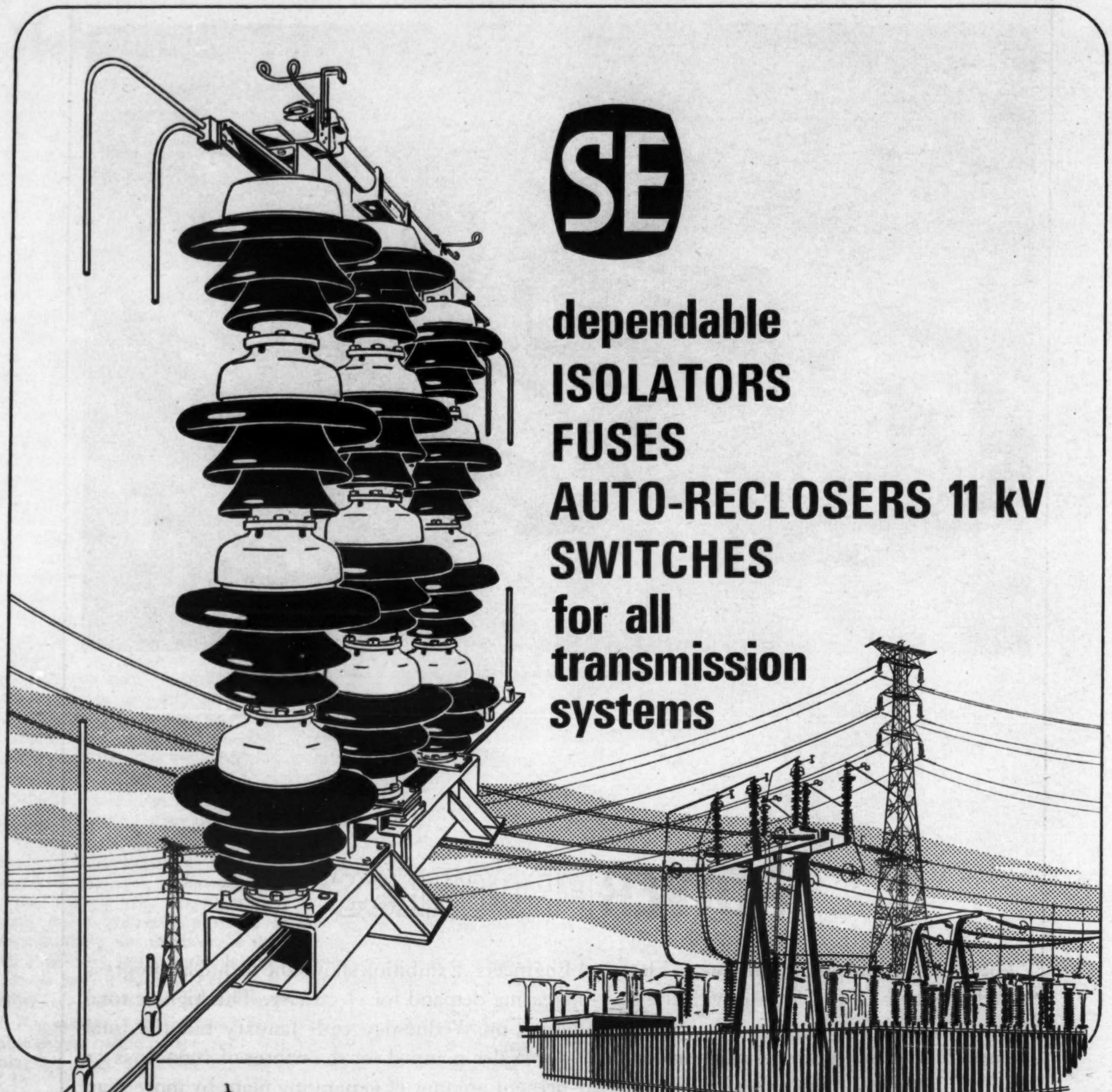

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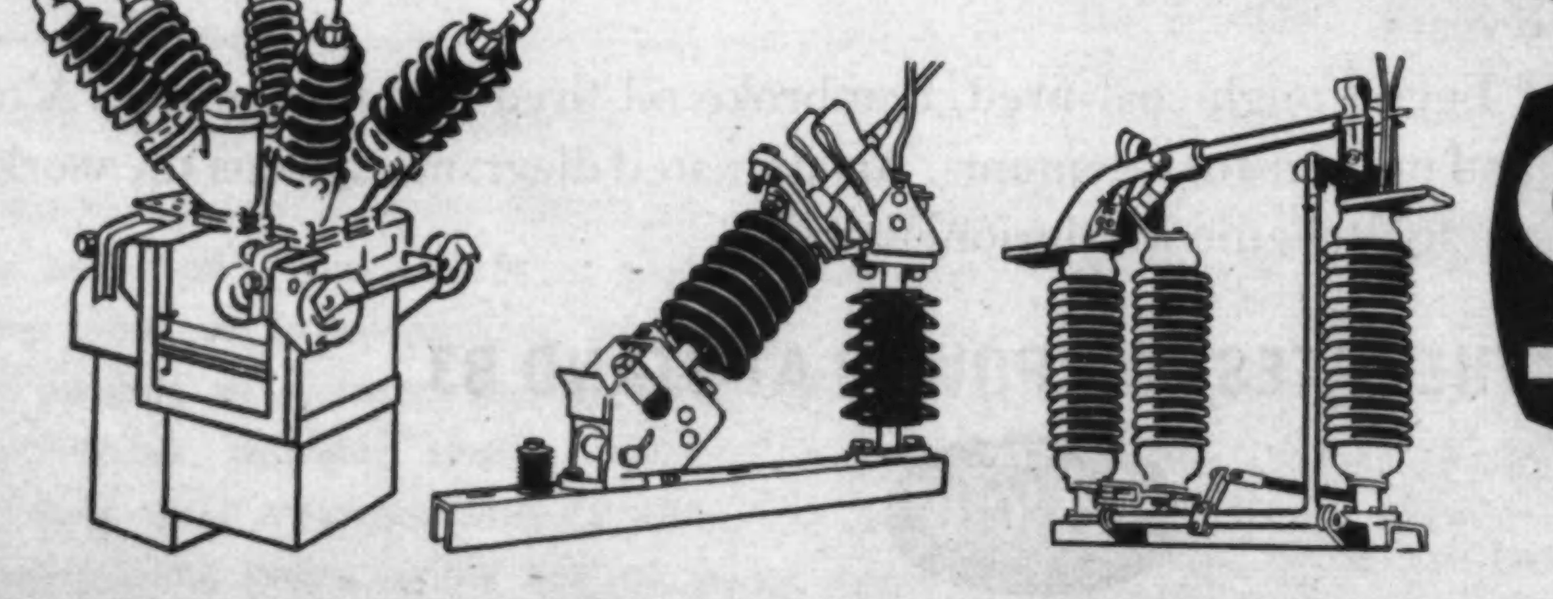

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Exports of British electrical machinery rose to £331 million last year

OVER THE DECADE 1954-1964 exports of electrical machinery have grown at an average rate of 5½ per cent a year. This was a rather higher rate of growth than that of exports as a whole, for which the average was 4½ per cent per annum and slightly higher than the average of 5 per cent per annum for manufactured goods only. The pattern of change over the decade has varied sharply from year to year, as is shown in table 1.

Taking the year 1965 by itself exports of electrical machinery at £331 million were a little over £16 million or 5 per cent higher than in 1964. Table 2 shows detailed figures for these exports over the past few years. The first category in the table, Electrical Power Machinery, accounts for just under one-sixth of the whole; exports in this group were some £7 million or 17 per cent above the figure for 1964 and higher than in the previous three years. Just over half of this increase (nearly £4 million) was in the various types of electric motors and their parts, which have shown steady expansion over the last few years. Exports of generators and transformers showed a sharp recovery in 1965, after the drop in 1964, but were still lower than in either 1962 or 1963. The category, Switchgear and Control Gear, showed a substantial increase in 1965 (about £6 million over 1964). Exports of electric distribution equipment on the other hand were slightly lower in 1965 than in both 1963 and 1964, although they were still well above the 1962 level. Exports of telecommunications equipment (other than television and radios), a category which covers telegraph and telephone equipment, plus communication equipment and radar, at £71.9 million in 1965 were at roughly the same level as in 1964.

Exports of the Television and Radios category have however diminished year by year since 1963 as have those of 'Domestic Electric Equipment'. The fall in this latter category has been chiefly in washing machines (although washing machine parts have shown some increase), the other items for the most part having shown only small changes.

The remaining category 'Other Electrical Machinery' increased by about £8 million or 9 per cent in 1965 over 1964, the increase being widely spread over the various types of equipment in this category. Notable increases were in 'batteries and accumulators', 'valves, cathode tubes and semi-conductors (including transistors)' and 'electrical instruments and meters'.

Areas and countries

Table 3 shows the market distribution of these exports during the past four years. It shows that 48 per cent (£158 million) went to the sterling area and 32 per cent (£106 million) to Western Europe in 1965. Eight per cent (£26 million) went to North America and to the miscellaneous 'Rest of World' group of countries and smaller percentages to Latin America and Soviet Eastern Europe.

Exports to the sterling area were £9 million (5½ per cent) higher in 1965 than in 1964. This increase was mainly in exports to South Africa, but Hong Kong also showed a good increase and exports to Australia recovered after their decline in 1964. Exports to New Zealand fell back in 1965 to roughly the 1963 level, and those to India showed a further drop after the decline of 1964.

Exports to Western Europe as a whole, although rather smaller than those to the sterling area have increased continuously over the the past four years. They were £5 million (5 per cent) higher in 1965 than in 1964. The most notable increase both absolutely and proportionately, was in exports to Spain which were over £3½ million (over 60 per cent) higher than in 1964. Exports to EEC at £52 million about equalled those in 1964. Within EEC exports to Italy fell sharply as compared with 1964, and those to France were a little lower. Exports to EFTA as a whole rose only slightly in 1965. Exports to Sweden, the major market, remained level at the previous year's value as did those to Norway. Those to Denmark increased slightly.

In North America exports to the United States fell in 1965 by over £2½ million back to the 1962 level, but those to Canada increased somewhat above the rather low figure for 1964.

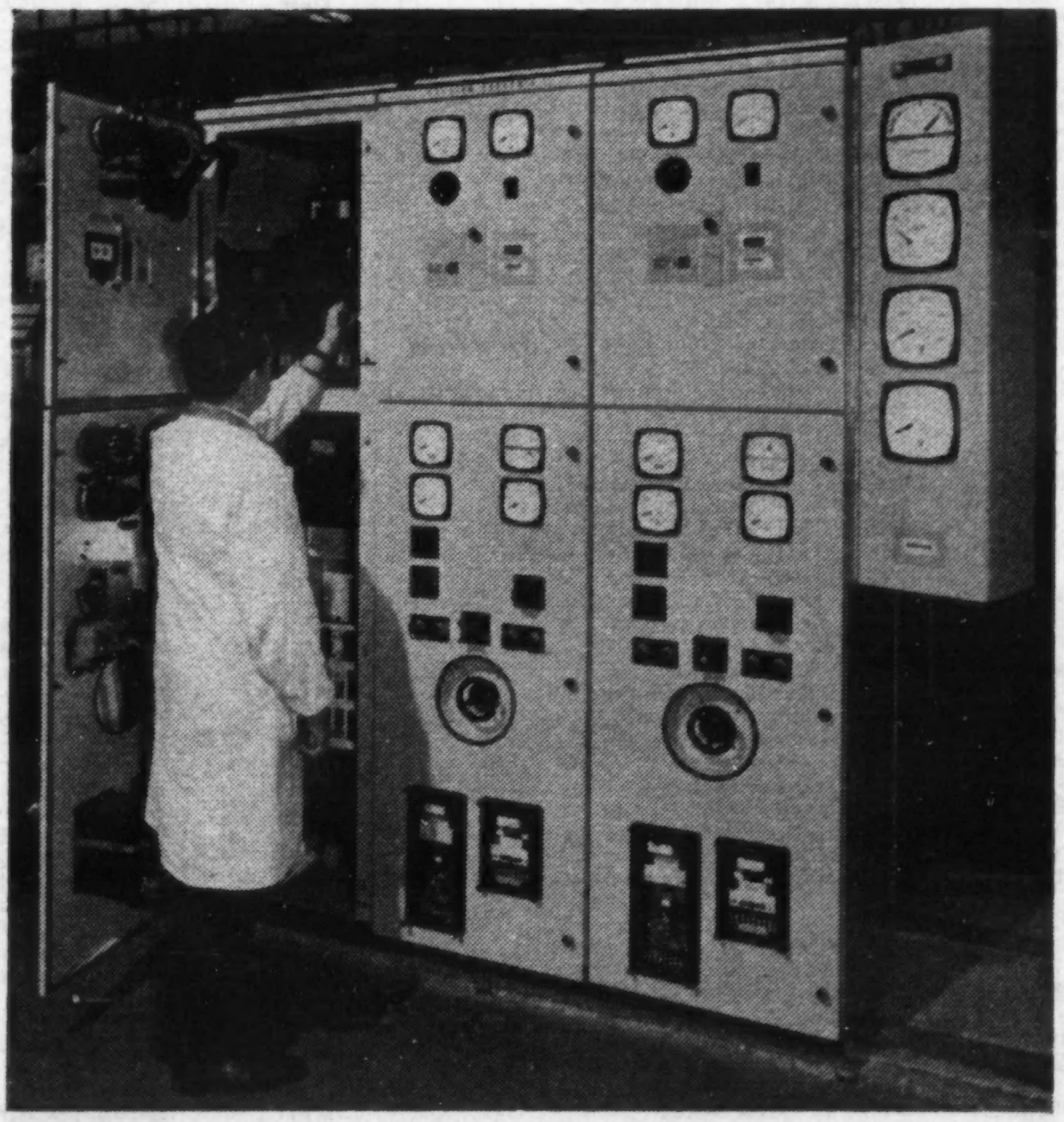
Exports to Latin America remained at the 1964 rate – rather lower than that for the previous two years and those to Soviet Eastern Europe stayed at about the level of the past three years. Exports to the miscellaneous 'Rest of World' group of countries increased in 1965 rather more noticeably than they did in 1964. These exports are spread over a large number of countries.

United Kingdom exports of electrical machinery, 1954-1964
TABLE 1

£ million (per cent change on year earlier)

1954	174·7	
1955	196·4	(+12)
1956	221·7	(+13)
1957	231·8	(+ 5)
1958	228·1	(— 2)
1959	238·0	(+ 4)
1960	(243·7	(+ 2)
1961	271·4	(+11)
1962	286·9	(+ 6)
1963	318·1	(+11)
1964	315·0	(— 1)
1965	330·9	(+ 5)

(*Continued on page xvii*)



English Electric are supplying three 350 kW diesel generating sets to James Mackie & Son of Belfast for a jute mill in Cambodia. The 415V switchboard, seen above, part of the order, is being prepared for shipment from English Electric's Liverpool works; it is complete with synchronization and excitation control facilities for the three alternators.

13th International Electrical Engineers Exhibition

A

K10	Aberdare Cables Ltd.
K10	Aberdare Engineering Ltd.
E11	AC-Delco Division of General Motors Ltd.
GG9	A.E.G. (Great Britain) Ltd.
K11	A.E.I. Lamp & Lighting Co. Ltd.
F7	Aerialite Limited—Aerial and Electronics Division
F7	Aerialite Limited—Cable Division
F7	Aerialite Limited—Domestic Appliance Division
F16	Agro Electrical Co. Ltd.
O11	Aircraft-Marine Products (G.B.) Ltd.
CC4	Aish & Co. Ltd.
D9	A.K. Fans Ltd.
KK17	Albright (Engineers) Ltd.
KK17	Albright Engineers (Exports) Ltd.
N2 & O15	Allen West & Co. Ltd.
N2	Allen West Automation Ltd.
K17	Allied Insulators Ltd.
FF9	Aluminium Wire & Cable Co. Ltd.
O11	Ampliversal (Div. of Aircraft-Marine Products (G.B.) Ltd.)
HH8	A.O.I.P. Electrical
KK3	Arcolectric Switches Ltd.
F4	Ashley Accessories Ltd.
EE10	Asquith Electrics (Colne) Ltd.
J14/K12 & L7	Associated Electrical Industries Ltd.
AA10	Association of Supervising Electrical Engineers
F4	Astral Switchgear Ltd.
L3	Ateliers De Secheron S.A., Des Fuller Electric Ltd.
J15	Atlas Lighting Ltd.
F13	Aumann K.G. Willy
FF16	Austin Motor Co. Ltd.
KK6	Austinlite Ltd.
MM10	Auto Diesels Ltd.
O18	Automation Ltd.
HH4	Avo Ltd.

B

OO6	B. & R. Relays Ltd.
OO15	Bach-Simpson Ltd.
B2	Backer Electric Co. Ltd.
G18	Bakelite Ltd.
J10	Baldwin & Co. Ltd., H.J.
PP9	Baldwin & Francis Ltd.
G19	Barries Electrical Agencies Ltd.
C2	Bassani
EE12	Bastat Electrical Equipment Ltd.
M13	Batiste Publications Ltd.
DD10/HH25	B.B.I. Lighting
KK16	Belling & Lee Ltd.
N8	Belmos Co. Ltd., The
N8	Belmos Peebles Switchgear Ltd.
J16	Benjamin Electric Ltd., The
G7/559	Berry's Electric Magicoal Ltd.
N6	Bertram Thomas (Engineers) Ltd.
F9	BICC-Burndy Ltd.
C5	Bill Switchgear Ltd.
G14	B.K.B. Electric Motors Ltd.
M8	Blackwell & Co. Ltd., F.C.
K11	B.L.I. Ltd.
KK7	Blume & Redecker GmbH
LL13/14	Bofors Tidaholmsverken AB
LL13/14	Bofors (Gt. Britain) Co. Ltd.
D6	Bolton & Sons Ltd., Thomas
O9	Bonded Direct Fixings Ltd.
K20	Bonnella & Son Ltd., D. H.
O4	Bourns (Trimpot) Ltd.
HH17	Bowden Bros. Ltd.
LL9	Bowthorpe Line Equipment Ltd. (Switch and Fusegear Division)
LL9	Bowthorpe Line Equipment Ltd. (Transmission Division)
DD6	Bray Ltd., E. N.
D1	Bray & Co. Ltd., Geo.
NN12	Bresges Elektromotoren GmbH
CC7	British Aluminium Co. Ltd., The
K3	British Electric Resistance Co. Ltd., The
AA17	British Electrical Approvals Board for Domestic Appliances
F9	British Insulated Callender's Cables Ltd.
N10	British Resistor Co. Ltd.
M9	Brook Motors Ltd.
D2	Brookhirst Igranic Ltd.
J13	Browning's Electric Co. Ltd.
N8	Bruce Peebles & Co. Ltd.
C6	Brush Electrical Engineering Co. Ltd.
L2	Bryce Capacitors Ltd.
L1	Bryce Transformers Ltd.
EE7	B.S.A. Electrics Ltd.
K17	Bullers Ltd.
G14	Bulpitt & Sons Ltd.
KK10	Busch-Jaeger Durener Metallwerke AG

C

NN5	Cable Covers Ltd. Power Engineers Equipment Division.
J21	Cable Supports Ltd.
EE9	Calidec Ltd.
HH20	Candell Ltd.
OO15	Canadian Government
AA19	Career Advertising Ltd.
AA19	Career Selection Ltd.
MM7	Carr Fastener Co. Ltd.
MM17	Cass & Phillip Ltd.
CC5	Catylators Ltd.
OO15	Central Dynamics Ltd.
B3	Central Electricity Generating Board
O18	Challis Ltd., Henry
PP2/JJ8	Chalmers & Mitchell Ltd., Andrew
F8	Chamberlain & Hookham Ltd.
C4	Chilton Electric Products Ltd.
C4	Chilton Electric Ltd.
F14	CIBA (A.R.L.) Ltd.
KK14/JJ3	Circulume Ltd.
AA14	City and Guilds of London Institute
J23	Clang Ltd.
J17	Clare-Elliott Ltd.
H1	Clare Instrument Co.
H2	Clarke & Co. (Manchester) Ltd., H.
HH23/JJ4/5	Clarke Electrical Co. Ltd.
F8	Claudgen Ltd.
MM9	C.M.P. Glands Ltd.
H9	Co-Axial Risers Ltd.
F13	Cole (Electronics) Ltd., R.H.
EE8	Collison (Goodwell) Ltd., H.F.
EE8	H. F. Collison (Goodwell) Ltd.
QQ6	Concordia Electric Wire & Cable Co. Ltd., The
HH17	Connaught Contractors Ltd.
KK4	Connollys (Blackley) Ltd.
G16	Contactum Ltd.
KK12	Control Instrument Ltd.
EE12	Conz Elektricitats-Gesellschaft MBH
L10	Copper Development Association
N7	Cordwallis Non-Ferrous Metals Ltd.
MM17	Coreci
M10	Courtney, Pope (Electrical) Ltd.
K13	Crabtree & Co. Ltd., J. A.
PP8	Crater Controls Ltd.
AA4	Crawley College of Further Education
G17	Cressall Manufacturing Co. Ltd., The
EE14	Critchley Bros. Ltd.
L8	Crompton Parkinson Ltd.
E12	Crossland Ltd., R. & A. G.
MM17	Crouzet England Ltd.

D

FF7	Dale Electric (Yorkshire) Ltd.
E3	Danfoss A/S.
E3	Danfoss (London) Ltd.
H6	Davis Sheet Metal Engineering Co. Ltd.
G6	Delta Controls Ltd.
N7	Delway Products Ltd.
L5	Dennis Ltd., G. P.
HH21/22	Designplan Lighting Ltd.
HH15	Deta (Overseas) Co. Ltd.
J8	Dimplex Ltd.
H4	Donovan Electrical Co. Ltd., The
J12	Doulton Industrial Porcelains Ltd.
F7	D. R. Illuminations Ltd.
K5	Dubilier Condenser Company (1925) Ltd.
H19	Dr. E. Durrwachter-Doduco-K.G.
MM8	Dyson & Co. Enfield (1919) Ltd.

E

G11	E.C.C. (Moulded Breakers) Ltd.
F3	E.D.C. Electricals Ltd.
OO15	Edwards of Canada Ltd.
J2	E.F. Electric Ltd.
K18	Egatube Ltd.
F6	EKCO-Ensign Electric Ltd.
F5	EKCO Heating & Electrical Ltd.
K17	Electric £ Ordnance Accessories Co. Ltd.
G11	Electric Construction (W'ton) Ltd.
NN12	Electric Fan Co. Ltd.
D8	Electric Power Storage Ltd.—Chloride Division
K24	Electric Power Storage Ltd.—Tudor Division
G12	Electrical Apparatus Co. Ltd., The
AA2	Electrical Association for Women
B5	Electrical Development Association
AA1	Electrical Industries Benevolent Association
M13	Electrical Manufacturer
OO15	Electrical Manufacturing Co. Ltd.
OO14	Electrical Refrigeration & Radio Engineers (Epping) Ltd.
L15	Electrical Remote Control Co. Ltd.
B4	Electrical Research Association
A7	Electrical Review
A4	Electrical Times Ltd., The
AA6	Electrical Trades Union
M13	Electrical Wholesaler
A6	Electrical Wholesalers Federation
AA5	Electricity Council, The
N1/3	Electro Automat Ltd.
F3	Electro Dynamic Construction Co. Ltd.
OO7	Electrocil Ltd.
F3	Electrodynamic & Hewitt Electronics Ltd.
K22	Electro Mechanical Manufacturing Co. Ltd.
DD3	Electro-Specials Ltd.
OO15	Electrovert Manufacturing Co. Ltd.
L3	Elektrim A.1. Factory Fuller Electric Ltd.
CC3	Ellams Duplicator Co. Ltd.
J17	Elliott-Automation Ltd.
J17	Elliott Brothers (London) Ltd.
M11	Ellison Ltd., George
LL8	EMP Electric Ltd.
J20	E.M.S. Electrical Products Ltd.
H14	Enfield Rolling Mills Ltd.
H14	Enfield-Standard Power Cables Ltd.
J19	Engel & Gibbs Ltd.
AA8	Engineering Industries Group Apprenticeship (E.I.G.A.)
D5 & O7	English Electric Co. Ltd.
K19	Erma Ltd.
F11	Erskine, Heap & Co. Ltd.
OO15	Esna Ltd.
HH17	Eureka Engineering Co. Ltd.
N8	Everett Edgcumbe & Co. Ltd.
L4	Evershed & Vignoles Ltd.
G17	Expanded Metal Co. Ltd., The

F

E8	Falks Ltd.
AA12	Faraday House Engineering College
FF17	Fawcett Preston & Co. Ltd.
G11	Federal Electric Ltd.
OO15	Federal Pacific Electric of Canada
J12	Ferguson (Electrical Engineers) Ltd., J.R.
C3	Ferranti Ltd.
KK15	Field & Grant Ltd.
L14	Fitzgibbon & Murray Ltd.
LL7	Flight Refuelling Ltd.
HH18/19/20	Fluorel Ltd.
FF12	Formica Ltd.
E7	Foster Transformers Ltd.
LL15	Fothergill & Harvey Ltd.
H3	Fractional H.P. Motors Ltd.
G5	Friedland Ltd., V. & E.
L3	Fuller Electric Ltd.

G

KK8	G. & M. Power Plant Co. Ltd.
OO15	Garrett Manufacturing Ltd.
F8	G.E.C. (Domestic Equipment) Ltd.
F8	G.E.C. (Engineering) Ltd.
F8	G.E.C. (Installation Equipment) Ltd.
F8	G.E.C. (Process Engineering) Ltd.
F8	General Electric Co. Ltd., The
A5	Gent & Co. Ltd.
F13	Gesellshaft fuer Elektrotechnik GmbH
BB1	Gilflex Conduits Ltd.
HH13	G.K.N. Screws & Fasteners Ltd.
HH5/JJ10	Glendor Research & Distribution Co. Ltd.
J25/DD13/16	G.P.O. London Telecommunications Region
MM11	Greenwood Airvac Conduits Ltd.

H

N6	Hackbridge and Hewittic Electric Co. Ltd.
L2	Hackbridge Cable Co. Ltd.
L2	Hackbridge Faraday Electrics Ltd.
F13	Haefner & Krullmann
KK2	Haffenden Ltd., W W..
H19	Harding (Worthing) Ltd., J.M.
CC5	Harmer & Simmons Ltd.
H8	Harvey Hubbell Ltd.
GG3	Hawke Cable Glands Ltd.
GG4	Hawker Electronics Ltd.
C6	Hawker Siddeley Group Ltd.
L12	Hawkins & Co. Ltd., L. G.
E2	Heatovent Electric Ltd.
L11	Heatrae Ltd.
B1	Heayberd & Co. Ltd., F. C.
H5	Hedin Ltd.
MM6	Hellermann Ltd.
MM6	Hellermann Deutsch Ltd.
MM6	Hellermann Electric Ltd.
MM6	Hellermann Equipment Ltd.
MM6	Hellermann Plastics Ltd.
MM6	Hellermann Terminals Ltd.
J22/HH23/JJ4/5	H. H. Electrical (London) Ltd.
HH5	Hightower Construction Co. Ltd.
M5	Hilmor Ltd.
O17	Hilti (Great Britain) Ltd.
NN4	Hird-Brown Ltd.
M14	Hirst Electric Industries Ltd.
L14	Hi-Scale Products Corp.
J7	Holophane Ltd.
JJ6/7	Homeshade Co. Ltd.
OO9	Horstmann Gear Company Ltd., The
GG5	Huber Ltd., J. J.
N9	Hunt (Capacitors) Ltd., A. H.
O3	Hysol International

I

D9	IMC Magnetics Corporation
O2	Imhof Ltd., Alfred
DD7	Imperial Chemical Industries Ltd. Plastics Division
HH5	Industrie Electrique de la Seine
AA11	Institution of Electrical and Electronics Technician Engineers Ltd.
AA9	Institution of Electrical Engineers
MM6	Insuloid Manufacturing Co. Ltd.
O6	Invest-Export
H19	Isola Werke A. G.
G15	Isopad Ltd.

J

OO3	James (Engravers) Ltd., John
J27	Jaz
MM17	Jeanrenaud
K15	Johnson & Nephew Ltd., Richard
H12	Johnson & Phillips Ltd.
OO8	J.R.D. Industrial Lighting Ltd.

K

DD2	K.D.G. Instruments Ltd.
OO15	Kelk Ltd., George
HH12	Kempston Electrical Co. Ltd.

List of Exhibitors

J1	Kent Bros. Electric Wire Co. & E. H. Phillips Ltd.
K7	Kent (Porcelains) Ltd., Wm.
J27	Kienzle Uhrenfabriken GmbH
L13	Kilpatrick & Son Ltd., James
J2	King Industries Ltd., Stewart
B6	Klaxon Ltd.
FF8	Klippon Electricals Ltd.
EE11	Klockner-Moeller England Ltd.
J26	Kobold GmbH, Georgii
F13	Kumag A.G.

L

OO15	Lacal Industries Ltd.
E7	Lancashire Dynamo & Crypto Limited
FF6	Lancashire Dynamo Electronic Products Ltd.
E7	Lancashire Dynamo Nevelin Ltd.
LL12	Landis & Gyr Ltd.
H21	Langley London Limited
DD8	Laur. Knudsen A/S
N4	Laurence, Scott & Electromotors Ltd.
FF18	Leroy Electric Motors Ltd.
E4	Lewden Metal Products Ltd.
K1	Light & Power Accessories Co. Ltd.
M10	Lighting Maintenance Co. Ltd., The
F3	Limit Sales (Holdings) Ltd.
CC2	Littex
OO15	Litton Systems (Canada) Ltd.
HH14	Lloyds Bank Ltd.
DD1	Logan & Co. Ltd., Walter
J17	Londex Limited
L9	London Electric Wire Company and Smiths Limited, The
L1	London Transformer Products Ltd.
GG6	Londtra Ltd.
O12	Long & Crawford Ltd.
L13	Lounsdale Electric Ltd.
EE6	Lucy & Co. Ltd., W.
QQ1/2/3	Lumitron Ltd.
M15	Lyons Ltd., Claude
C2	Lyvia of London Ltd.

M

K6	M. & C. Switchgear Ltd.
KK1	Mackie & Co. Ltd., W.
J5	Magneta (B.V.C.) Limited
M2	Magnetic & Electrical Alloys Ltd.
J3	Major Equipment Co. Ltd.
G13	Mantel Metalworkers Ltd.
HH5	Mapelec S.A.
O18	Marbaix Limited, Gaston E.
O18	Marbaix Industries Limited
G2	Marryat & Place Ltd.
HH5/JJ10	Martin & Lunel Ltd.
HH5/JJ10	Martin & Lunel S.A.
M6	Mason & Morton Ltd.
NN1/2/3	Mather & Platt Ltd.
C1	Mawdsley's Ltd.
F1	M.C.B. Co. (Lupus) Ltd.
E10	McGeoch & Co. (Birmingham) Ltd., Wm.
L14	Mehne GmbH, J. G.
NN10	Merlin & Gerin
NN10	Mertech Electrical Equipment Ltd.
G19	Metway Electrical Industries Ltd.
HH7	Metzenauer & Jung GmbH
O8	Micafil Ltd.
M12	Micanite & Insulators Co. Ltd., The
NN17	Microprecision Ltd.
MM12	Midland Bank Limited
J26	Midland Dynamo Co. Ltd., The
D4	Midland Electric Manufacturing Co. Ltd.
L9	Millett, Levens (Engravers) Ltd.
AA18	Ministry of Defence P.R.12 (R.A.F.)
FF15	Ministry of Public Building & Works
O1	Minnesota Mining & Manufacturing Co. Ltd.
F10	M.K. Electric Limited
NN17	M.L. Aviation Co. Ltd.
NN17	M.L. Engineering Co. Ltd.
NN17	M.L. Engineering (Plymouth) Ltd.
OO2	Modern Linegear Ltd.
QQ4	Morecambe Electrical Equipment Co. Ltd.
GG11	Morganite Resistors Limited
DD11	Morley's Electrical Services Ltd.
DD11	Morlite Engineering Ltd.
DD11	Morlite Signs Ltd.
FF18	Moteurs Leroy S.A.R.L.
J27	MotoMeter
H10	M.T.E. Control Gear Limited
DD5	Mullard Limited
LL4	Multilumina Ltd.
MM15	Mycalex Limited
MM15	Mycalex & T.I.M. Limited

N

C7	Nalder Bros. & Thompson Ltd.
AA3	National Inspection Council for Electrical Installation Contracting, The
F7	Nettle Accessories Limited
H7	Newage Lyon Limited
L6	Newman Industries Limited
KK12	Newton Brothers (Derby) Ltd.
A11	Nife Batteries
FF19	Nobrac Carbon Ltd.
L3	Norsk Teknisk Porcelenfabrikk Fuller Electric Ltd.
AA13	Northern Polytechnic
HH10	N.S.F. Ltd.

O

FF19	Offord-Seebright Ltd.
LL15	Ogden, Smith & Hussey Ltd.
E10	Osler & Faraday Ltd.
F8	Osram (G.E.C.) Ltd.
HH1	Otter Controls Ltd.
HH11	Ottermill Switchgear Limited
JJ1/2	Otmerod Ltd.
F15	Overhead Line Fittings Ltd.

P

A8	P. & B. Engineering Co. Ltd.
J6	Painton & Co. Ltd.
EE15	Pan-Electric S.p.A.
FF10	Parmeko Ltd.
A1/2	Parmiter, Hope & Sugden Ltd.
G4	Partridge, Wilson & Co. Ltd.
HH3	Parvalux Electric Motors Ltd.
C8	Peppers of Woking Ltd.
MM17	Perivale Controls Ltd.
QQ5	Perkins & Smith Ltd., John M.
K9	Permali Limited
MM17	Petercem
M6	Pfeiffer GmbH, Arthur
E5	Pirelli Construction Company Ltd.
E5	Pirelli General Cable Works Ltd.
GG8	Plastic Tube & Conduit Co. Ltd.
M4	Poles Limited
H15	Power Centre Co. Ltd., The
C8	Power Connectors Ltd.
KK5	Preformed Line Products (G.B.) Ltd.
L9	Printed Circuits Ltd.
J4	Process Control Gear Ltd.
L12	Pye Electric Ltd.
G9	Pyrotenax Limited

Q

PP1	Quickdraw Company Ltd., The

R

F8	Radio & Allied Industries Ltd.
KK11	Ranco Limited
KK11	Ranco Controls Ltd.
KK11	Ranco Motors Ltd.
H20	Rawlplug Company Ltd., The
G3	Record Electrical Co. Ltd., The
J26	Reid & Sigrist Ltd.
F13	Reutlinger & Sohne, Dr.
D3	Revo Electric Co. Ltd.
E9	Reyrolle & Co. Ltd., A.
H19	Rheinische Kohlebürstenfabrik Franz Wenzel, K.G.
J27	Richter Pfortzheim
HH6	Ringslade Limited
EE13	Rist's Wires & Cables Ltd.
L3	Ritz (Dr. Ing Hans) Messwandlerwk GmbH Fuller Electric Ltd.
J2	Rolco Engineering Ltd.
MM15	Rosite Limited
CC6	Ross, Courtney & Co. Ltd.
HH17	Rotaire Driers Ltd.
K16	Rowlands Electrical Accessories Ltd.
CC11/15	Royal Corps of Signals, The
MM16	Royal Navy

S

F8	Salford Electrical Instruments Ltd.
C2	Sams Electrical (London) Ltd.
C4	Sanders Switchgear Ltd.
OO15	Sangamo Co. Ltd.
G8	Santon Limited
NN7	S. & B. Commutators Ltd.
G17	S.C.E.E. Limited
MM17	Schmersal
LL11	Schofield & Co. Ltd., E. J.
D7	Scholes & Co. Ltd., Geo. H.
AA15	School of Electronic Engineering, R.E.M.E., The
F13	Schumann, Heinrich
NN7	Scott & Co. Ltd., Geo. L.
PP6	Sellotape Products Limited
A3	Shaw Publishing Co. Ltd.
OO4	Shawford Control Gear Co. Ltd.
OO4	Shawford Engineering Co. Ltd.
EE1	Sheen (Nottingham) Ltd.
PP11	Shell Chemical Co. Ltd.
CC4	Sieger Ltd., J. & S.
MM13	Siemens (United Kingdom) Ltd.
L3	Sieverts Kabelverk A.B. Fuller Electric Ltd
HH7	Simmons Elect. Services (Sutton) Ltd.
GG7	Simon Equipment Ltd.
H13	Simplex-GE Ltd.
O5/13	Simplex Electric Co. Ltd. (Creda)
M1	Simplex Time Recorder Co. (U.K.) Ltd.
OO15	Sinclair Radio Laboratories Ltd.
CC1	Small Power Machine Co. Ltd., The
J18	Smith Ltd., Herman
FF11	Smith Hobson Ltd.
L9	Smith & Co., Frederick
OO5	Smith & Nephew (Tape Product Group) Ltd.
J18	Smithlite Ltd.
F12	Smiths Industries Ltd., Ceramics Division
F12	Smiths Industries Ltd., Clock & Watch Division
F12	Smiths Industries Ltd., Clock & Watch Division, Appliance Controls Branch
F12	Smiths Industries Ltd., Motor Accessory Division, Air Moving Department
F12	Smiths Industries Ltd., Motor Accessory Division, Otterspool Way
HH5	Societe Bac.
NN13	Sound Diffusion Ltd.
K10	South Wales Switchgear Limited
GG10	Square D Limited
O10/19	Standard Telephones & Cables Limited
M3	Statter Ltd., J. G.
GG11	Steatite & Porcelain Products Limited
GG8	Sterling Cable Co. Ltd.
DD12	Sterling Heating Systems Ltd.
C2/HH24	Sullam Ltd., S. D.
LL6	Surrey Steel Components Ltd.
PP5	Switchgear & Cowans Ltd.
E1	Switchgear Engineering Ltd.
LL10	Switchgear & Equipment Limited
K21	Symons & Co. Ltd., H. D.
J2	Stewart King Industries Ltd.

T

HH4	Taylor Electrical Instruments Ltd.
K17	Taylor Tunnicliff & Co. Ltd.
K17	Taylor Tunnicliff (Refractories) Ltd.
O6	Techna (Great Britain) Ltd.
NN10	Technirep (Electrical) Ltd.
K11	T.E.I. Ltd.
M2	Telcon-Magnetic Cores Ltd.
M2	Telcon Metals Ltd.
OO13	Telegraph Condenser Co. Ltd.
GG12	Telemecanique Electrique, La
GG12	Telemecanique Electrique (Great Britain) Ltd.
DD4	Telerelays Ltd.
M2	Temco Limited
H18	Tetra Engineering Co. Ltd.
CC9	Thermair Domestic Appliances Ltd.
J10	Thermat Ltd.
H22	Thermodare (Great Britain)
HH16	Thornycroft & Co. Limited, John I.
F2	Thorpe Ltd., F. W.
HH2	Thousand and One Lamps Limited
GG6	Thuillier M.C.A., S.E.B.
NN17	Tiefenbach Ltd., Dr. H.
J27	Time Instrument Manufacturers Ltd.
OO15	T.M.C. (Canada) Ltd.
M13	Trade News Ltd.
EE5	Transelektro Trading Co.
OO15	Trench Electric Ltd.
L5	Trunduct Limited
M11	Tufnol Ltd.
CC8	Tulgrace Lighting (Tulgrace Ltd.)
EE16	Tungstone Products Ltd.
CC6	Tyer & Co. Ltd.

U

EE17	Ucan Development Limited
M7	U.K. Solenoid Ltd.
F12	Uni-Tubes Ltd.
KK13	Utilux Pty. Limited

V

L9	Vactite Wire Co. Ltd.
A9/10	Valor Vanguard Ltd.
H16	Varilectric Ltd.
G1	Venner Ltd.
NN6	Vent-Axia Limited
F3	Veritys Fans (Holdings) Ltd.
E10	Veritys (Maxiume) Limited
E10	Veritys (Switchgear) Limited
K2	Vickers Ltd. IOCO
K4	Victor Products (Wallsend) Ltd.
QQ7	Vuille Control Panels Ltd.

W

K7	Wade & Son Ltd., George
K7	Wade (Ulster) Ltd.
K8	Walker & Co. (Engineers) Ltd., W. G.
H9	Wallacetown Engineering Co. Ltd.
E6	Walsall Conduits Limited
J9	Wandsworth Electrical Manufacturing Co. Ltd.
OO1	Ward & Co., E. A.
OO1	Ward's Flexible Rod Co. Ltd.
H17	Watliff Company Limited
K14	Watford Electric & Manufacturing Co. Limited
F13	Weber, Karl
F13	Weber, Oskar
FF8	Weidmueller K.G., C. A.
MM9	Welinlok Limited
LL3	Weller Electric Corporation
HH17	Welmec Corporation 'A.E.G. U.K.' Ltd.
G10	Westinghouse Brake & Signal Co. Ltd.
PP10	Westminster Bank Limited
J3	Westwood Switchgear Ltd.
J24	Whipp & Bourne Ltd.
PP3/4	Whitelegg Ltd., Frank
KK14	Williams & Co. (Electrical Engineers) Ltd., J. R.
DD9	Willsher & Quick Ltd.
AA16	Wimbledon Technical College
EE2/3/4	Winster Products
J10	Wireohms (Universal) Ltd.
J11	Widen Transformer Co. Ltd.
F8	Woods of Colchester Ltd.
KK16	Wootten & Co. Ltd.
LL5	Work Study Equipments Ltd.
L3	W.S.W. Vienna Fuller Electric Ltd.

Y

K23	Yorkshire Switchgear & Engineering Co. Ltd.

Z

L3	Zellweger Ltd. Fuller Electric Ltd.
FF11	Zenith Electric Co. Ltd., The

A.S.E.E. Exhibition

Earls Court, London · March 23-30

MAKE YOUR FIRST STOP

FULLER

Stand L.3

GROUND FLOOR

See the latest range of On-Load Tap Changers, the new Fuller space saving A.C. variable speed Commutator Motors, H.V. and L.V. Capacitors and Current Transformers. Detailed information also available at the Stand on Ripple Control, Lightning Arresters and Capacitor Voltage Transformers.

Also on show, a scaled model of the new 'Site Assembly' Transformer.

Consult **FULLER ELECTRIC** at A.S.E.E.

LONDON, E.17

A
HAWKER SIDDELEY
COMPANY

Hawker Siddeley Group supplies mechanical, electrical and aerospace capital equipment with world-wide sales and service.

Switch to ESB to export electrical goods

If you want to export things large or small in the field of electrical goods (and this extends to electronics and similar 'space age' products), a call on the resources of the Export Services Branch of the Board of Trade, Hillgate House, 35 Old Bailey, London, E.C.4 (or any of the Board of Trade's nine Regional Offices including one in Northern Ireland) could be most illuminating.

There is no time for modesty in exporting. It is therefore appropriate to state Export Services Branch's claim that they have quicker access to more information about the prospects for marketing any single (or bulk) item in the vast range of British electrical goods than any other single body and as many readers already know, their services are free. Moreover, this is a non-stop process. It is active as you read this article, at whatever time of day or night, since their's is a world-wide organization stretching to the veriest corners of the earth through a network of Commercial Officers sent and stationed abroad to devote all their energies to promoting the sale of goods made in Britain.

How is it done? Obviously the best way of finding out is for you to *visit* them with a sample, or illustrations of your product.

There is information waiting for you about business conditions, local production and imports, local tastes and peculiarities, trading methods and other foreign competition relating to your product, be it the tiniest transistor or the mightiest generator.

Precise and up to date information (it comes in by intercontinental telephone, telex, cable – whichever is the fastest – at every hour of the day and night) about tariff and important regulations is also available. The electrical industry will not need to be told that their products are prime movers in seeing that all this vital information reaches Export Services Branch in a matter of microseconds. Those who are already exporting will at once appreciate the importance of speed since tariff and import regulations are changing somewhere or other all the time.

Assuming that your product is already established in the home market – in effect, that it is a saleable product, the next problem you may wish to discuss is how to establish a connection with a first-class selling agent abroad – and care in the selection of agents is factor number 1, not only in selling abroad, but continuing to sell abroad.

Here again, Export Services Branch will start by compiling, with your help, (so it is much better to visit the branch rather than write) a carefully prepared brief about the product and your requirements. Armed with this brief, Export Services Branch will consult the Commercial Officer in one or more of a short selection of countries in which there are prospects of business. It is a regular part of the duties of the Commercial Officer to cultivate a wide field of contacts and suggestions he makes as to likely agents will be based on his personal knowledge and experience. Before advising Export Services Branch he will already have approached them to establish interest in your product and will know that they are willing to consider an agency for you.

The final decision rests with you and the ideal way, once again, is to *visit* the agent in the country where he is going to sell your goods. This way, you will not only know your agent as a man, and beyond that a salesman, but you will know more of his problems. Equally, he will know you. Here could be applied the business adage: 'It's not what you know, but whom you know'. Possibly far fetched in this connection but it still applies. Export Services Branch can help you plan this visit but do not be deterred if it is impracticable to arrange it at the outset.

If the agent appears to be suitable, and achieves your – and his – object of selling your goods, don't neglect him. Bring him over to your works in Britain. You may even be willing that he should bring his wife, she could be the power behind the agency throne! You may regard some of the foregoing as no more than beautiful

(Continued on page xix)

EXPORTS OF ELECTRICAL MACHINERY, *continued*

United Kingdom exports of electrical machinery, 1962-1965

TABLE 2

(Division 72 of the Standard International Trade Classification)

£ million (per cent change on year earlier)

	1962	1963	1964	1965
Electric Power Machinery ...	43·8	46·3 (+5½)	42·4 (—8½)	49·6 (+17)
Generating sets, generators & parts	19·9	19·5	15·6	17·3
Motors—small (under 250 h.p.)	9·1	9·9	10·8	12·1
Motors—large	2·0	1·9	1·8	2·0
Parts of motors	2·8	3·7	4·5	6·8
Transformers	8·7	8·9	6·9	7·7
Other electric power machinery	1·3	2·4	2·8	3·7
Switchgear and Control Gear	21·8	31·3 (+43½)	31·4 (+½)	37·1 (+18)
Electric Distribution Equipment	27·9	35·2 (+26)	35·3 (0)	33·9 (—4)
Television & Radios	73·2	10·0	8·0	7·7
Other Telecommunications Equipment		68·3	72·4 (+6)	71·9 (—½)
Domestic Electric Equipment	31·7	35·6 (+12½)	34·8 (—2)	32·1 (—8)
Washing Machines ...	9·4	11·2	8·9	5·5
Washing Machine parts ...	—	2·7	3·2	4·1
Vacuum Cleaners	3·2	3·5	4·0	4·2
Vacuum Cleaner parts ...	1·1	1·4	1·4	1·5
Other domestic electric equipment...	—	16·8	17·3	16·8
Other Electrical Machinery ...	88·5	91·4 (+3½)	90·3 (—1)	98·6 (+9)
Batteries and Accumulators	11·7	11·5	12·8	14·4
Lamps	4·5	5·6	5·8	6·7
Valves, cathode tubes, semiconductors including transistors	11·7	12·2	12·4	13·7
Electrical equipment for vehicles and I.C. engines ...	2·8	9·1	9·7	8·9
Electrical instruments and meters	17·7	20·2	21·2	22·8
Electrical hand tools ...	3·5	3·7	4·8	5·8
Miscellaneous electrical machinery	—	28·0	21·3	23·7
TOTAL ELECTRICAL MACHINERY	286·9	318·1 (+11)	314·6 (—1)	330·9 (+5)

United Kingdom exports of electrical machinery

TABLE 3

(Division 72 of the Standard International Trade Classification analysed by Areas).

£ million (per cent change on year earlier)

	1962	1963	1964	1965
NORTH AMERICA	25·6	31·0	26·6	26·3
United States and dependencies .	12·9	15·1	15·2	12·5
Canada	12·7	15·9	11·4	13·8
WESTERN EUROPE	83·0	90·6	100·4	105·6
EEC	44·2	48·7	52·1	51·9
Germany	11·6	11·9	12·5	14·2
Netherlands	12·3	12·5	13·8	15·3
France	8·3	11·2	11·8	10·9
Italy	8·0	8·2	8·4	6·4
Belgium/Luxembourg . . .	4·0	4·9	5·6	5·1
EFTA	29·7	30·6	36·9	37·5
Sweden	9·2	10·9	11·8	11·8
Norway.	4·9	4·6	5·6	5·4
Denmark	4·3	3·9	5·7	6·5
Finland	3·4	3·5	5·1	4·7
Other EFTA	7·9	7·7	8·7	9·1
REST OF WESTERN EUROPE . . .	9·1	11·3	11·4	16·2
Spain	0·8	1·7	5·9	9·5
STERLING AREA	137·9	154·3	149·6	157·8
Australia	25·9	24·0	22·2	24·3
New Zealand	12·8	13·9	15·1	13·4
South Africa	18·0	22·9	21·2	26·4
Irish Republic	8·1	9·7	10·3	10·4
India	13·0	19·0	17·9	14·2
Malaysia	8·8	9·8	10·6	11·3
Hong Kong	6·8	10·6	10·4	13·1
Nigeria	6·0	5·4	5·8	6·6
Other	38·5	39·0	36·1	38·1
LATIN AMERICA	12·1	13·3	9·2	9·1
SOVIET EASTERN EUROPE . . .	5·5	6·1	5·9	6·2
REST OF WORLD.	22·9	22·8	23·2	25·8
TOTAL ELECTRICAL MACHINERY . .	286·9	318·1	315·0	330·9

GLASS FIBRE LAMINATES

GLASS FABRICS
'TERYLENE' FABRIC
'FLOMAT' REINFORCED MOULDINGS
GLASS BANDING TAPES
'NUGLAS' TUBES

We will be delighted to discuss and advise you on the countless applications of these products

WE LOOK FORWARD TO SEEING YOU ON

STAND L.L. 15

at the Electrical Engineers Exhibition

Fothergill & Harvey Ltd

FERGUSON

moulded in 'Ethox' epoxide resin

STANDARD BUSHINGS

POST INSULATORS

. Covering a wide range of applications, Ferguson Bushings and Insulators comply with British Standard Specifications throughout. Details and prices on application.

SOLE U.K. AGENTS and STOCKISTS for "RESARM" and "TRANSFORMERWOOD" densified laminated wood

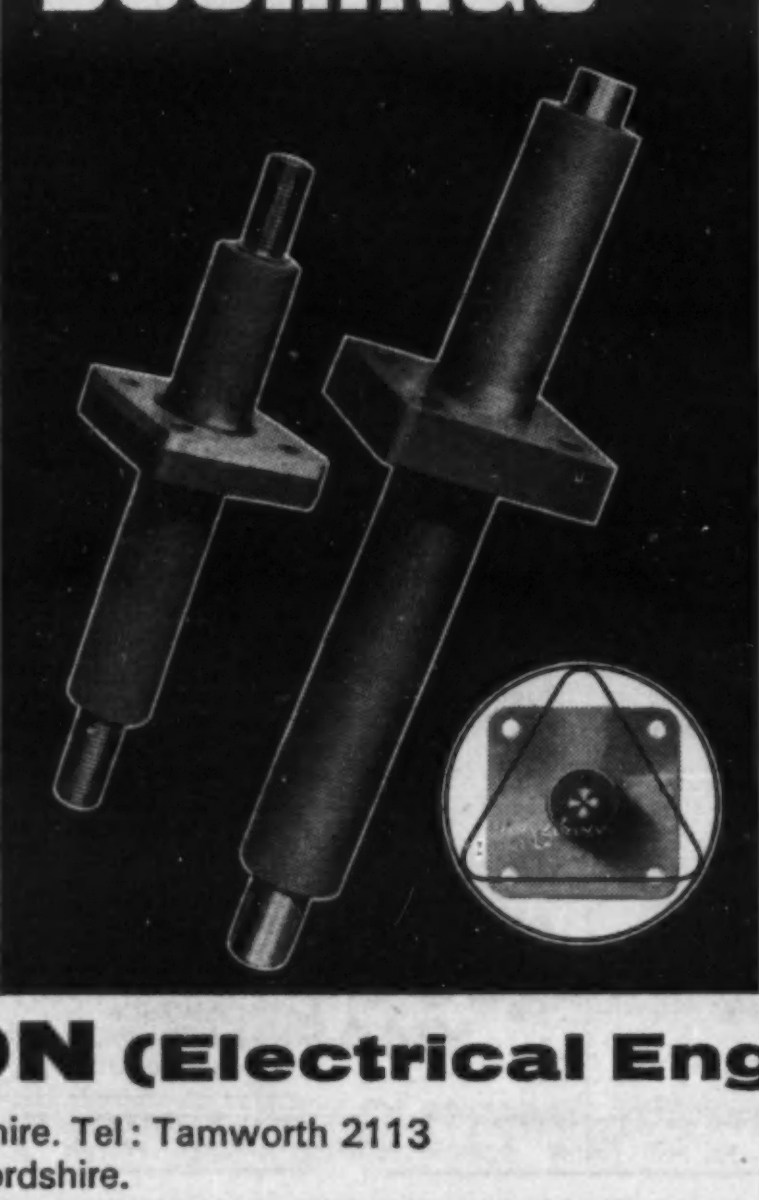
See us on STAND J12
GROUND FLOOR, A.S.E.E.
EXHIBITION, EARLS COURT

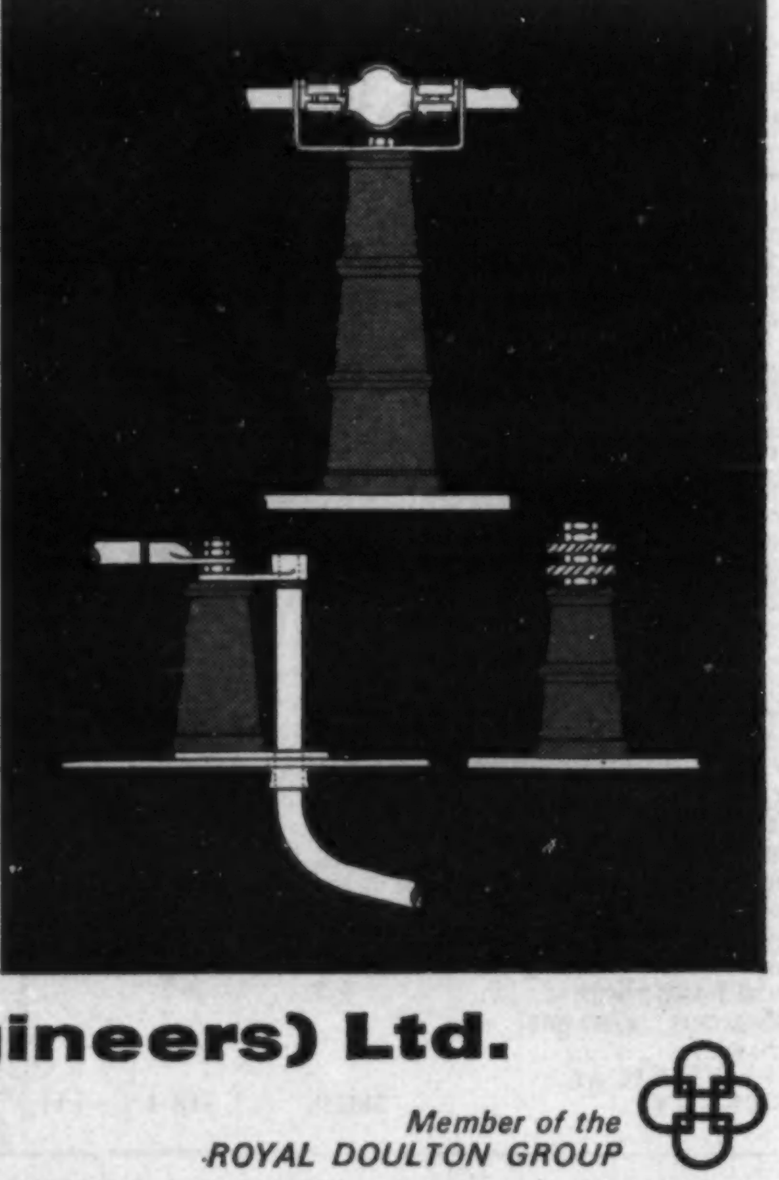
J. R. FERGUSON (Electrical Engineers) Ltd.

Sales Office— Two Gates, Tamworth, Staffordshire. Tel: Tamworth 2113
Works—Dukinfield, Cheshire and Rugeley, Staffordshire.

Member of the
ROYAL DOULTON GROUP

H.497·1





theory; not so. Export Services Branch officers will do all this and more as part and parcel of their everyday duty. Example: An American firm wrote direct to Export Services Branch for the names of British manufacturers of small high purity metal discs for semi-conductors. An Export Services Branch officer promptly advised the appropriate manufacturers' association. A British manufacturer was, as a direct result, asked to quote for quantities (quoted from an actual telegram) of two parts up to 100 million and four other parts up to 50 million. The telegram added that this was an initial inquiry. If prices were competitive, other parts would be required.

Below are two more instances of the efforts of Commercial Officers:

From Tehran: Television in Iran

The British Embassy provided the only authoritative version of the Government's future plans for television:

(1) The Government intends before the end of the Third Development Plan (which ends in 1967) to inaugurate television in Tehran, Abadan, Rasht, Ahwaz and Dezful, leaving Tabriz and Meshed for the Fourth Development Plan, beginning in 1968.

(2) It has been decided to adopt the European system of 625-lines. The privately-owned commercial television network of Iran, which currently uses the American system, will be invited to come into line.

(3) The plans for the towns listed above are:

(a) *Tehran:* Two 10 kW transmitters, linked in Parallel, to provide 20 kW backed by a network of studios. It is hoped to obtain satisfactory reception in areas as far apart as Qasvin and Qum.

(b) *Abadan:* As for Tehran, but with only one small studio.

(c) *Rasht:* One 10 kW transmitter and a studio serving the Caspian coastal belt from Astara to Chalus.

(d) *Ahwaz:* One 10 kW transmitter and studio.

(e) *Dezful:* One 2 kW transmitter, but no studio.

From Vancouver, B.C.: the Portage Mountain Dam and Columbia River project

Contracts most likely to be of interest to British manufacturers for:

Manifolds and draft tubes
Spillways
Low level outlets
Elevators
Lighting
Sewage treatment
Pumping equipment
Generator main connections and transformer cubicles
Cranes
Batteries and charging gear

These actual cases and the earlier narrative represent a microcosm but a pretty fair sample of the day by day services provided by Export Services Branch in London and the Regional Offices, backed by their network of Commercial Officers overseas.

Their efforts do not go entirely unpraised. Here is the body of a letter from one of Britain's largest electrical firm's overseas division:

> 'Thank you for all the help that you gave me before my tour of Sudan, Ethiopia and East Africa; in addition I called into Libya, Egypt and Greece. I would like you to know that I received every assistance from the overseas officers in these countries and the general information and contacts which they gave were extremely useful in doing my job. We will of course advise you of any agents that are appointed as a result of my visits.'

The Export Services Branch of the Board of Trade (and all its ramifications) which, or rather who, are working all the time on your behalf to promote British exports do not ask for thanks. They would rather that more would-be exporters of electrical products seek their advice. Just now they are doing their best to cope with up to 500 inquiries a month in London alone. But they are prepared to tackle more.

EXPORT OPENINGS FOR THE ELECTRICAL INDUSTRY

THESE current export openings for electrical manufacturers are a few examples of many which are published regularly in the *Export Service Bulletin*. The *Bulletin*, which is issued daily from Monday to Friday, provides detailed up to the minute information obtained from the British Commercial Diplomatic Officers overseas such as – Market Pointers, Export Opportunities and Tenders. In addition comprehensive Market Reports on individual commodities are published from time to time. A quarterly review 'World Economic Comments', is also published. This gives short appraisals of the general economic and commercial climate in over 100 countries. Each report runs to about 250 words. Subscription to the complete *Bulletin* service costs only £10 10s. per annum, a modest charge for such an essential tool for the serious British exporter. Further particulars, subscription forms and specimen copies may be obtained from Bulletin Section, Export Services Branch, Room H28, Hillgate House, 35 Old Bailey, London, E.C.4. (Tel. City 5757, Ext. 7058). Telex: 25977. Answer back: Bothillgate LDN.).

JORDAN
ESB.2143/66
Electric and telephone cables, transformers.
Agency inquiry.

SWITZERLAND
ESB.3159/66
Fluorescent panels, timbers.
Export opportunity.

TRINIDAD and TOBAGO
ESB.3803/66
Electrical engineering equipment.
Export opportunity.

ZAMBIA
ESB.4182/66
Air-conditioners, cookers, refrigerators and components, washing machines.
Agency inquiry.

VENEZUELA
ESB.4702/66
Circuit breakers, insulators, panel boards.
Agency inquiry.

PHILIPPINES
ESB.3021/66.
Air-conditioning and refrigerator units.
Export opportunity.

URUGUAY
ESB.6112/66
Electrical circuit breakers and switches.
Agency inquiry.

AUSTRALIA
ESB.4477/66
Public address equipment, T/V and Hi-fi equipment.
Agency inquiry.

INDIA
ESB.6320/66
Generating plant and equipment.
Tender.

SOUTH AFRICA
ESB.5644/66
Transformers.
Tender.

NORWAY
ESB.5465/66
Insulators.
Tender.

FR

FR 'RELOG' REED LOGIC MODULES
for fast, low-level switching in any environment — at low cost.

FR REED SWITCHES
the widest range of magnetic reed switches in Britain today.

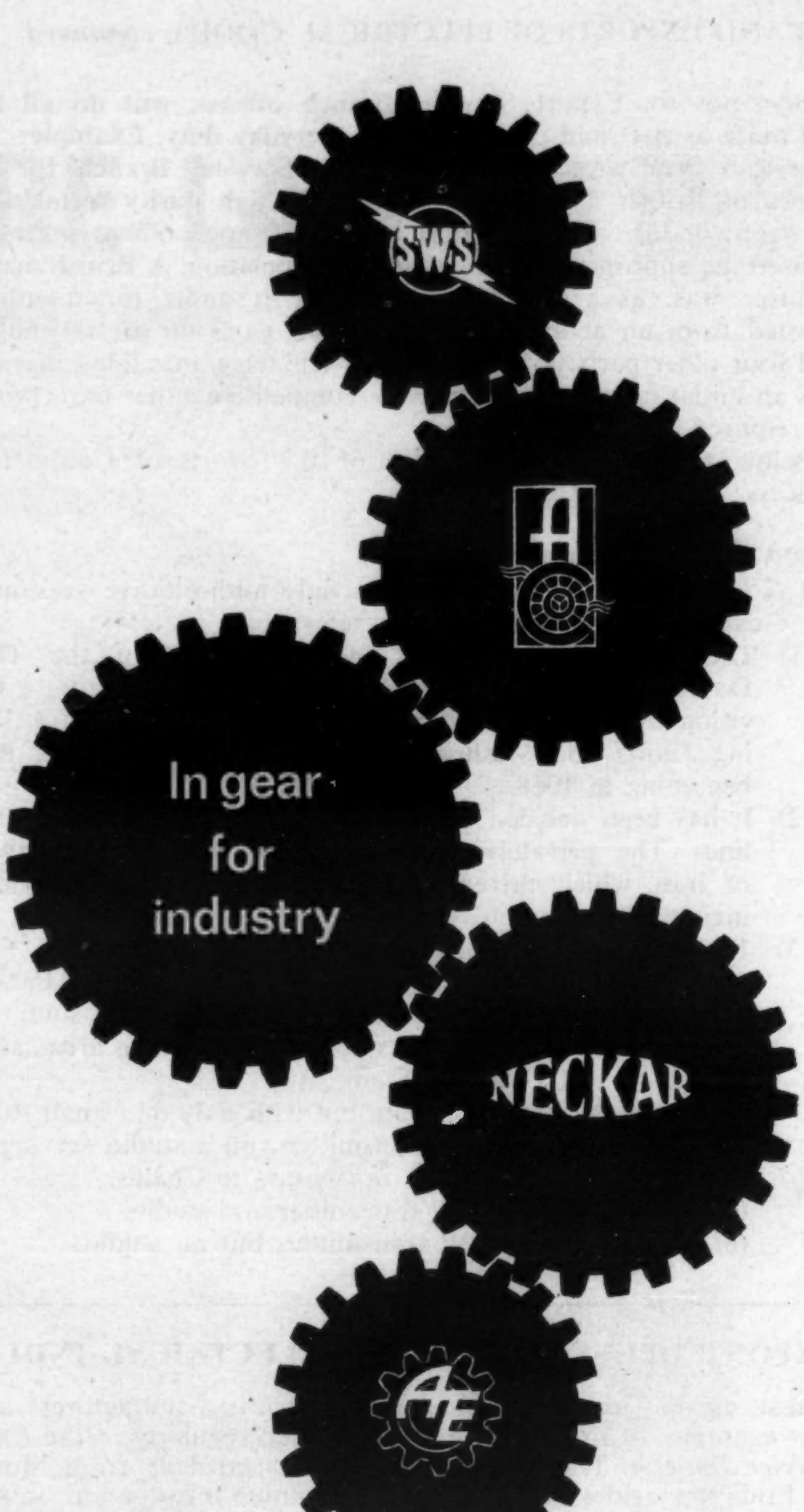
STAND L17

FR 'SERVOTOR' SYSTEM
low cost speed control for any variator to 0·5% accuracy.

Logically . . . for low-cost reed switching process and speed control — it's FR! On show will be the complete FR range — plus brand new productions, including: reed stepping switches; 'Stoptex' stop motion switches; 'Slubtex' reed slub clearing units; and reed 'Programme' units.

STOP PRESS!* *Special demonstration of FR's phenomenal Paging Radio—30-mile range, 45 channels, vocal call-up plus the power to penetrate the toughest industrial locations.

FR INDUSTRIAL ELECTRONICS
Flight Refuelling Ltd,
Wimborne, Dorset. Tel: Wimborne 2121
Cables: Refuelling Wimborne. Telex 41168



Throughout the world, electric supply authorities, public utilities and a wide range of industries benefit from the prompt efficient service offered by the Aberdare Group of Companies – South Wales Switchgear Limited – switchgear and transformers; Aberdare Cables Limited – power cables up to 33 kV; Aberdare Engineering Limited – sootblowers and general engineering; Neckar Water Treatment Limited – water treatment plant.

The Aberdare Group

BLACKWOOD, MONMOUTHSHIRE & ABERDARE, GLAMORGAN

AH12

Features from the Stands

BELOW and on succeeding pages are illustrated a selection of the wide variety of electrical goods which will be displayed on the stands. Space precludes mentioning the products of every manufacturer.

Education, research, etc.

The main themes on the Nalder Bros. and Thompson Ltd. stand will be associated with education and research, environmental hazards, contact-making and design features which have been standardized in instruments ranging in size from 1in. to 42ins. The firm will show the range of their instruments which are of special interest to educational establishments and research laboratories and which will include electrostatic voltmeters, fluxmeters, sensitive micro-ammeters and millivoltmeters, and instruments of Laboratory Standard and Precision Grade Accuracy. There will be examples of instruments in sealed cases capable of operating under difficult climatic conditions and also of instruments having a high endurance and capable of being read accurately under conditions of shock and vibration.

Fixing products

UCAN Development Ltd., an associate of the BSA Group, will exhibit a comprehensive range of fixing products designed for the professional man. Substantial cost reductions can be obtained by using Ucan fixing products and services – whether you are fixing spacer or ordinary saddles, buckle clips, MI cable, trunking, switchgear, meter boards, etc. The firm will also exhibit for the first time a number of new items including pins and studs, fast fixings and automatic cartridge ejection The above are in addition to existing products such as the speed drills, Widia and Panther drill bits, the Ucan range of plugs – fibre, aluminium, brass, plastic building adhesives, masonry nails, self-drilling anchors, hand tools and the KS7 safety cartridge tool.

Ceramics

Industrial ceramics will share the limelight with epoxide resin castings and densified laminated wood products to be shown by Doulton Industrial Porcelains Ltd. and J. R. Ferguson (Electrical Engineers) Ltd. Both companies are members of the Royal Doulton Group.

On the ceramics side, Doulton lay emphasis on extra high voltage insulators. Prominent on the stand will be a 400 kV porcelain CT weathershield made in a single piece which represents a considerable advance in manufacturing technique. Other exhibits will include Multicone post insulators for service voltages up to 400 kV, suspension, tension, pin and post insulators for transmission and distribution lines and 25 kV insulators for railway electrification. Ferguson, too, concentrate on high voltage insulation. Conspicuous on their part of the stand will be 'Ethox' epoxide resin castings and a full range of switchgear and transformer components for all voltage levels. In addition, 275, 400 and 700 kV re-entrant cast shells are displayed.

Cables

Weller
W-TCP
60 WATTS
WELLER ELECTRIC CORP.
KINGSTON, ONT., CANADA
MADE IN CANADA

A Weller temperature-controlled soldering-iron, with safety-holder, which contains a completely isolated transformer.

Seven manufacturing divisions of British Insulated Callender's Cables Ltd. will be represented featuring power cables, wiring and general cables, mineral insulated cables, winding wires, capacitors, wire mill products and accessories, which will include a glass-fibre protection box which serves also as a container for materials used to make a 33 kV straight joint.

Variable speed A.C. motors

The most conspicuous item to be exhibited by Laurence, Scott & Electromotors Ltd. will be a 3140/125 h.p., 760/250 r.p.m., 11 kV N-S variable-speed AC motor – one of a number to be supplied for draught fans for the computerized Fawley power station. This is claimed to be by far the most powerful variable-speed AC commutator motor ever made in the world. It is of weatherproof closed-air-circuit type with air/air heat exchanger. By contrast, a small N-S motor from the standard stock range will be shown as a running demonstration. More than a million horse-power of N-S motors has now been supplied and they are in use in every technically advanced country, including the United States and Russia.

Lighting fittings

The Benjamin Electric Ltd. are displaying a complete range of their lighting fittings and have designed and manufactured many new models since the last exhibition, and these will be demonstrated on their stand. Their catalogued lines include fluorescent, tungsten, mercury and outdoor fittings, the majority of which are household names in the lighting and electrical industries, i.e., 'Benecon,' 'Litemaster,' 'Taskmaster,' 'Lustra,' 'Focaset,' 'RLM' and many others. Their outdoor display is of particular interest, inasmuch, that there is a demonstration indicating the method of installing some of the floodlights which are being used to illuminate Westminster Abbey for its 900 years' celebration. This is supported by large photographs of the Abbey illustrating the excellent results obtained.

Telephone and radio systems

The Private Telephone department of AEI Telecommunications Group is to display a range of its products including a private telephone system providing a simple and reliable link between two points; a radio paging system which provides direct, continuous and personal single-way radio contact from a central point to individuals via receivers weighing a few ounces.

Wiring accessories

A comprehensive display of electrical wiring accessories, circuit breakers and motor control gear will be mounted by J. A. Crabtree & Co. Ltd. The wiring accessories, largely for AC circuits, will include tumbler and rocker operated switches for surface and flush mounting, socket-outlets and switched socket-outlets in round-pin as well as 13 amp. patterns, fused spur units and lampholders. The miniature and moulded case circuit breakers cover an extensive variety of units for both domestic and industrial use, and include the popular C-50 miniature circuit breakers and the E-60 voltage-operated earth-leakage patterns. New developments include an extension of the C-50 triple pole range to 50 amp., whilst the Crabtree L-60 current-operated earth-leakage unit will be seen in a new form, its moulded overall cover having a distinct family likeness to the C-50 consumer's unit.

Multi-purpose lighting fittings

Victor Products (Wallsend) Ltd. will be showing examples of their versatile range of flameproof, flameproof-weatherproof and multi-purpose lighting fittings. New products on show will include oil pipeline heating terminal box, Division 2 bulkhead lighting fitting, Division 2 well glass lighting fitting for 80 or 125 watt MBF/U lamps.

Swiss television order

EMI Electronics Limited, Hayes, Middlesex, has received an order worth approximately £20,000 to supply television broadcast equipment for the Swiss television service.

Automatic electrical control

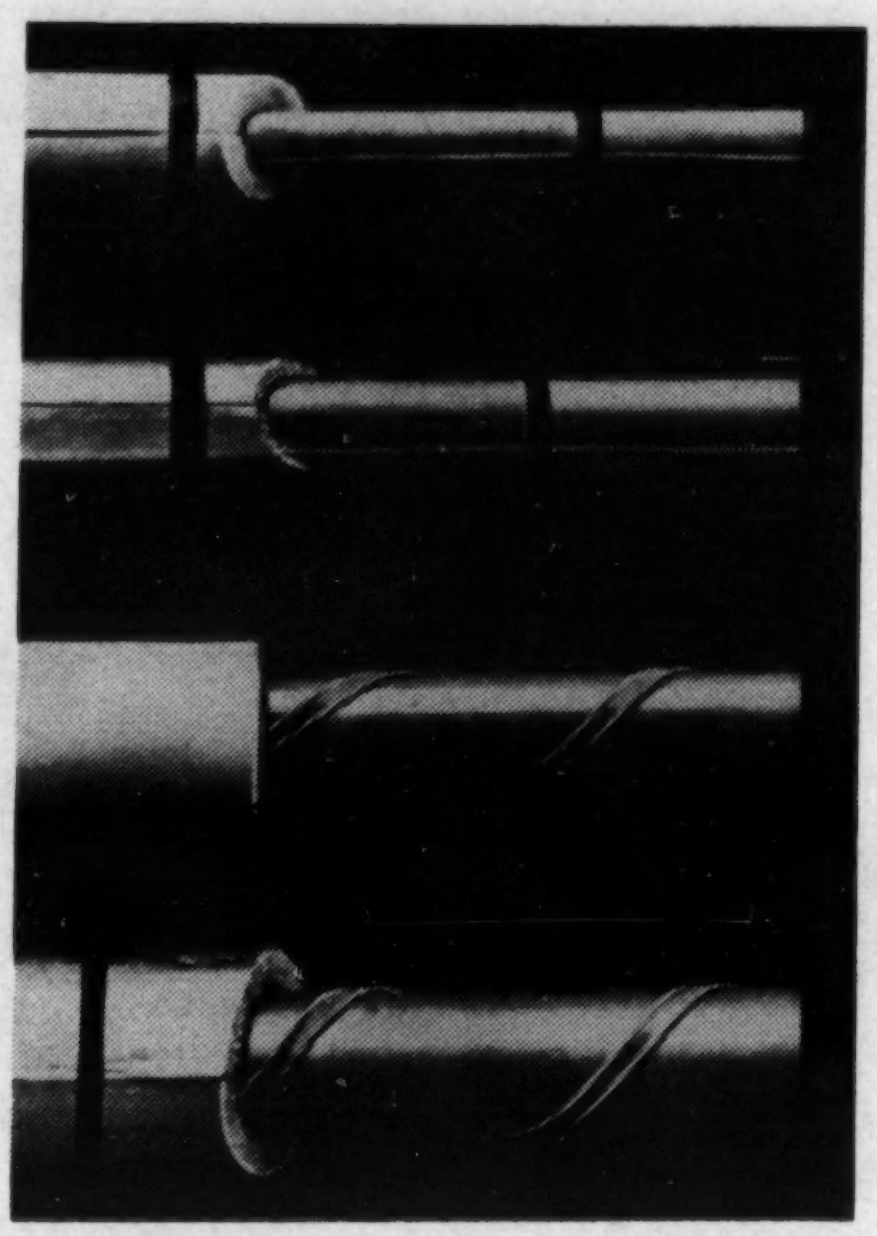
Many new products will be shown for the first time on the Elliott-Automation stand which will include a new fault-warning annunciator system; new models of electrical measuring instruments for standards laboratories, switchboard and recording applications; relays, switches, timers and a comprehensive range of automatic electrical control equipment.

Switches

M K Electric Limited will be exhibiting their comprehensive range of electric wiring accessories together with the following new products: a new range of surface steel boxes convert all flush M K accessories to surface mounting and ideal for MICC or conduit installations; 15/20 amp. single pole and double pole switches for appliance mounting – dolly or rocker operated and colour coded indicating – red for 'on' and black for 'off'; new 25 amp. twin double pole switch which has been developed so that fan and heater circuits of controlled output thermal storage heaters can be isolated by one switch dolly; and a 20 amp. double pole surface and flush switches with flex outlet and optional pilot lamps.

Wire and drilling machines

Automation Ltd. will exhibit for the first time in the United Kingdom their Model 841 solderless wire wrap machine and their new lead screw tapping unit. Other items include the Model 810A automatic wire stripping machine. Model T100C Toroidal coil winding machine and the Series 20 automatic 'Resistance' bench type drilling machine.



Isotapes type ITX for frost protection with thermal insulation, mostly straight – traced, spiralled on large bore pipes and manufactured by Isopad Ltd.

Accent on new instruments

The Evershed & Vignoles stand will be given over entirely to the products sold by the Instrument Division of the company: 'Megger' electrical testing instruments, Evershed recorders and the product of two overseas companies merchanted by the Instrument Division – process control equipment by P. Gossen GmbH, Western Germany and load indicators manufactured by the James G. Biddle Company, United States. A full range of Biddle load indicators will be shown. Some of the wide range of Gossen process control equipment will be shown working and this will include 'moving light' and 'moving pointer' control indicators, temperature controllers and small solid state DC amplifiers.

Anodized labels

J. J. Huber Ltd. will introduce to the British market Fotofoil etched, anodized aluminium nameplates, schematics, labels, etc. Fotofoil is an anodized aluminium sheet coated by a special process with a photo-sensitive chemical-resistant material. It has numerous usages – nameplates, instructions and identification plates, control panels, gauge and instrument dials, schematics, templates, switch indicators, pressure sensitive labels, property tags, etc. and is equally applicable to the laboratory making only one or two parts a day to the production line requiring thousands of parts daily.

'Standardization'

Theme of the Newman Industries Ltd. display of electric motors will be 'standardization'. On show will be a representative selection of their AC induction motors, ranging in size from 1/16 h.p. to 1,000 h.p. and in drip-proof ventilated, totally-enclosed and flameproof/explosion proof enclosures. Emphasis will be on their availability to almost any established world standard, such as BSS, NEMA (American) and Metric – including the proposed new British/Metric and re-rated NEMA sizes. Among the speciality motors on show will be those equipped with quick-acting

from NOW ON
THE
WIZARD
OF
OZ/ins
FRACMO

STAND No. H3
A.S.E.E. EXHIBITION

There is no wizardry about our geared motor units. Just sound design, skill and precision engineering. Admittedly, they have often been referred to as—wizard! Our standard range has output speeds from ⅛ r.p.m. to 600 r.p.m., torques from 8 ozs.-ins. to 850 lbs.-ins. Our Research Department are continually making improvements in the design and development of our products, to maintain and improve performance and quality – so ensuring FRACMO keeps its lead in the field of small power drives.

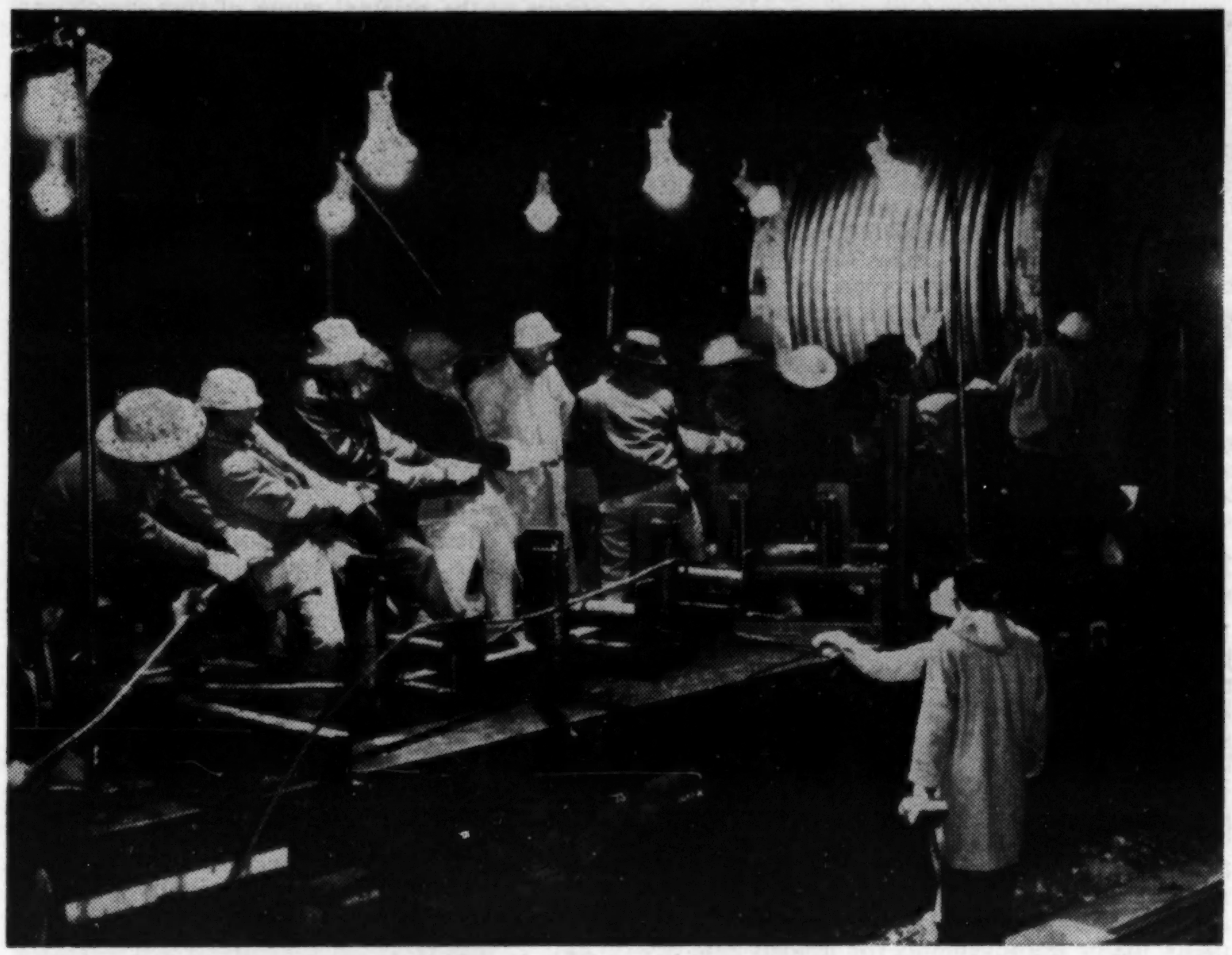
FRACTIONAL H.P. MOTORS LTD
(a member of the Lindustries Group)

Millmarsh Lane, Brimsdown, Nr. Enfield, Middlesex, telephone HOWard 4775 (10 lines)
grams & cables Fracmo Enfield Middlesex, telex No. 262436

Computer control for Sweden's first nuclear power station

Marviken, Sweden's first commercial nuclear power station is to have completely automatic start-up, running and shut-down control provided by a closed-loop on-line AEI CON/PAC 4060 process computer with three AEI Type 1400 alpha numeric displays. This is the first time that a process computer has been used for the automatic start-up shut-down of a nuclear reactor plant.

The order, which is worth £110,000 for hardware, was won by AEI Automation Limited, part of AEI Electronics, in the face of intense competition from the United States and European computer manufacturers.



BICC 66kV oil-filled cables being installed with the aid of staff of British Insulated Callender's Construction Co. Ltd. for the China Light and Power Company in Hong Kong. The route of the cable is between Hok-Un Power Station and Beacon Hill sub-station, and work on the railway section of the route was carried out at night to avoid dislocation to traffic.

electromagnetic disc brakes, gear motor units, vertical solid and hollow-shaft motors for deep-well pumping applications, AC commutator motors and variable-speed DC motors equipped with thyristor control.

Transformers

Several new products, including motors, transformers and switchgear, will be shown for the first time by Crompton Parkinson Limited. New designs of both switchgear and transformers will be shown in the form of a composite outdoor sub-station comprising a 500 kVA T1 transformer with radiator bank coolers, an 11 kV oil switch unit with earth and test contacts, and a typical medium voltage distribution cubicle.

Compactness and ease of installation have been the aims in the design of this sub-station, and 750 and 1,000 kVA versions are also available. The core and windings of the transformer will be displayed separately to show details of construction.

Isotapes

Isopad Limited will stress in their exhibits applications in flameproof areas division 1 and division 2. Displays will show installations to give the same performance and temperature setting out division 1 and division 2 side by side. In addition, there will be demonstrations of Isotapes for tracing of fuel oil lines and frost protection as well as samples of typical electric surface heating applications.

Exports feature

The recently-formed electrical division of the Valor Company Ltd., which for the first time brings together all products made by Valor Engineering Ltd. and Valor Vanguard Ltd., will show its complete range of appliances. A special feature of the stand will be an Exports section, with multi-lingual staff, which will provide a service to foreign visitors at the exhibition. The Electrical Division of the company now exports to more than 70 countries. New products will include: the '66 Series' of infra-red heaters, the Thunderbolt heat and light unit, the Valor BZ 3-4 twin fluorescent fitting and prismatic diffuser, the Valor Consultant range of intermediate section fittings, the Amsterdam series of circular light fittings and the Valor wall light and new glasses for circular fittings.

Distribution sub-station unit

The four principal companies of the Bruce Peebles Group will include the following new exhibits in their display: the completed 15-ton core/winding assembly of an 11.5/18.2 MVA 33/11 kV ON/OFB-cooled system transformer of the 'integrated' type; a prototype distribution sub-station unit, comprising a 500 kVA 11 kV/415 V ON-cooled distribution transformer and its associated h.v. switchgear and l.v. distribution equipment, all mounted on an integral underbase and handleable as a single unit; the completed rotor assembly, with its core and squirrel-cage winding and with the two main pump impellers, of an 800 h.p. 1,485 rev./min. 3.3 kV water-filled induction motor/glandless pump combination for a de-aerator lift duty at the CEGB's Fawley generating station.

Circuit-breaker

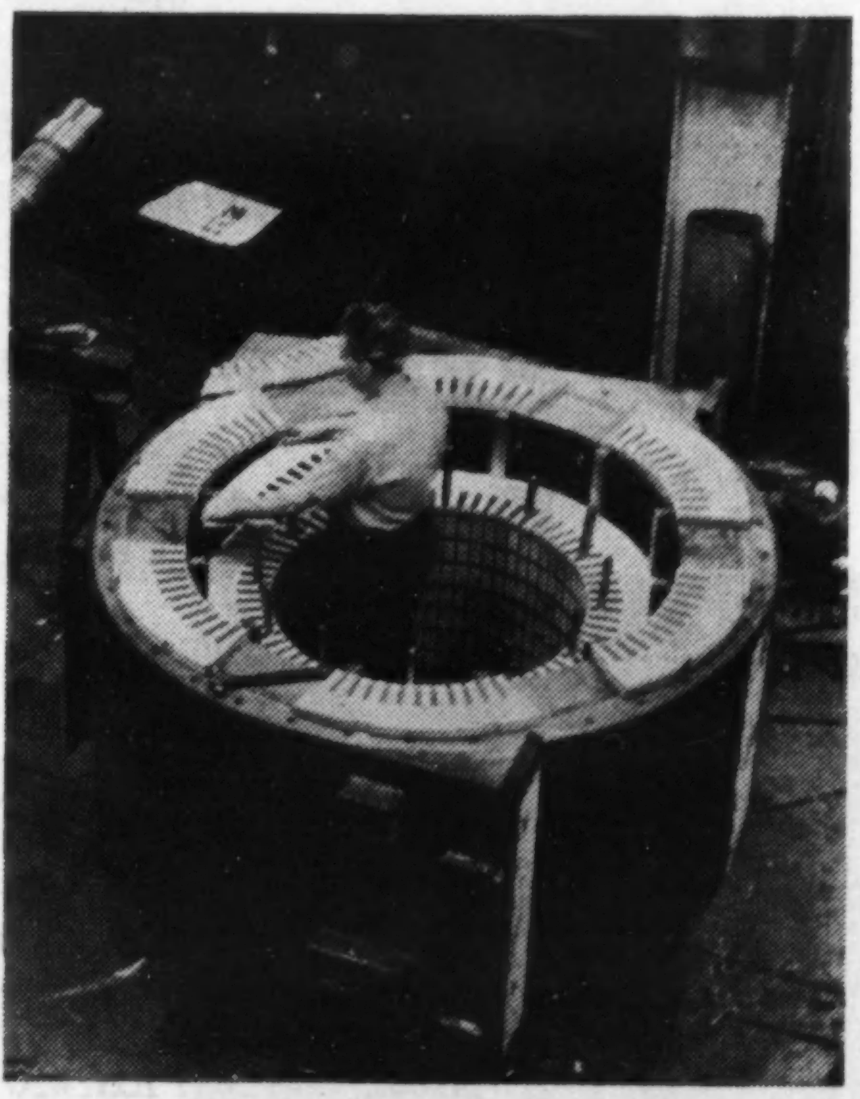
Dominating the forecourt at Earls Court will be one phase of an English Electric 400 kV frame 'r' air-blast circuit-breaker, 23ft. (7m.) high and weighing 19 tons. New products to be introduced will include a 750 kVA outdoor sub-station comprising transformer, oil switches and m.v. distribution board; a 1600A on-load fuse-switch; and a new multi-motor control centre, the Mk. IV. The company's Reinforced Plastics Division is to participate for the first time, showing high-strength insulation products including ducts, support columns, shafts and poles using filament winding, vacuum impregnation and extrusion techniques.

Cable marking sleeves

Six companies in the Bowthorpe Holdings Ltd. group will feature high performance cable marking sleeves and sleeve fitting tools; cable clips, lacings, strapping and studs; spiral bindings; binding and wiring tools; 'Flexiform' grommets in Nylon and Teflon; 'Heladuct' slotted trunking in rigid PVC; transistor heat sinks, mounting pads and holders; 'Dymo' embossing tapewriters. New products will include 'Helaclip' clip-on type sleeves and cable markers; 'Tyton' cable binding tool which can save up to 50 per cent in time and money over other methods of permanent binding; and a 'Flexiform' do-it-yourself grommet strip.

Teaching consoles

The Dursley, Glos., electrical manufacturing company of Mawdsley's Ltd. are to show a new range of teaching consoles which offer packaged equipment for demonstrating from secondary school level of education to regional technical college and even first-year university levels. Each console is complete in



Assembling the segmental stator core of a 3,250 hp 990 rev/min 11 kV squirrel-cage induction motor at the Bruce Peebles and Co. Ltd. works.

itself in that it contains a fully-instrumentated electrical machine having certain characteristics, either AC or DC types, which can be used to demonstrate the characteristics of the machine and its instruments. Each machine has a rapid coupling mechanism which enables two machines to be coupled together in less than a minute. This means that an AC motor can quickly be coupled to a DC generator to provide a motor/generator set, and so on. Additional features enable any number of machines to be coupled together mechanically and incorporate such auxiliary items as tachometers, so that not only the simplest machine but also the most complicated range of machines take only a few minutes to assemble. This will benefit teachers and lecturers who find that shortage of laboratory staff and the like encroaches on teaching time.

Electrical heaters

Ekco Heating and Electrical Ltd., will display a wide range of electric heaters designed to meet almost every industrial, commercial and domestic requirement. Included in the display will be convectors and radiant heaters, forced-air convectors, tubular heaters, skirting heaters etc. Details of several new models will be released at the Exhibition.

The latest developments in Ekco thermal-storage radiators will be seen in the new FT101 and FT102 'Thermostors'. Type FT101 has a 1½ kW loading and measures 26in. high x 22in. wide x 9in. deep. Type FT102 has a 3 kW loading and measures 26in. high x 41in. wide x 9in. deep. Both models are finished with side panels in selected sapele mahogany veneer. The tops are pearl grey and the front panels are in bluestone grey.

AC motors

The Brook Motors Ltd., stand will feature a wide selection of products with emphasis on the international appeal and acceptability of their AC motors. For the first time a range of TEFC motors to British Standard Draft Specifications with metric dimensions will be displayed, along with their new American 'Kompact' range of motors which complies with the most recent NEMA Specifications for Drip-Proof and Totally Enclosed Fan-Cooled types. The IEC/DIN range of TEFC motors are included, these complying with all Continental standards. A good representation of BS fractional horsepower and industrial motors with both totally enclosed fan-cooled and drip-proof enclosures will be on show, and many items from their standard control gear range.

Other items of interest will include: motors fitted with disc and drum type magnetic brakes, flameproof and weatherproof motors, marine motors, sealed stator/rotor units, a sectionalized silent motor and a drip-proof motor with 'encapsulated' windings, running completely submerged in brine.

Metaclad switchgear

The latest design of metalclad switchgear for 11 kV service is being shown for the first time by the Switchgear Division of Associated Electrical Industries Ltd. The switchgear will be known as Type BVP22, and it is designed for single busbar application with a vertically isolated, truck-mounted oil circuit-breaker and air-insulated busbar and current-transformer chambers, with 'through' type current-transformers.

Another new product to be shown for the first time will be the type PB02 overcurrent and earth-fault relay, the latest version of an established range of relays, which incorporates many major improvements for graded-time discriminative protection of electrical plant.

Dry-type transformers

A new range of cast resin-encapsulated h.v. metalclad switchgear with integral earthing will be the chief exhibit on the Johnson & Phillips Ltd. stand. The company will also be showing the full range of JunoPlan m.v. Load Centre equipment, the scope of which has been greatly expanded by the addition of such items as dry-type transformers, air circuit-breakers and capacitors to the original range of fuse-switchgear.

A typical dry-type transformer with class 'C' insulation suitable for inclusion in a Juno-Plan load centre or package substation will be among the transformer exhibits.

The display of cables will include samples of the mains, wiring, control and special purpose cables manufactured and emphasize the leading role played by the company in the cable industry.

Ceramic resistance heaters

With nearly 40 years' experience in designing and producing industrial and domestic elements heating of all kinds, Geo. Bray and Co. Limited, are showing their comprehensive range of ceramic embedded resistance heaters, sufficient to solve most heating problems in the medium heat range, 538°C – (1,000°F).

Bray elements are used in a very wide field of industries, some examples of processes and products in which these elements are being successfully used are displayed. They are made in four types, strip, ring and cartridge elements and Tubalox – all of metal-clad construction.

Research Items

Seven research items of outstanding interest will be featured on the Electrical Research Association stand. They cover – contact wear, novel methods of thermal storage; creep bursting tests, rotating machines; testing of HV fuse links in an oscillation circuit, ERA lighting flash counter and mercury bath test for capacitor paper.

Marine switchgear

Over the past few years a considerable number of main switchboards have been supplied by Hackbridge-Faraday Electrics Ltd., to well known firms in the shipbuilding industry. On view will be a part of a main switchboard for a 90,000 DWT Tanker. The physical size of the complete board prevents the whole being

(Continued on page xxvi)

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Lasso general purpose insulating tapes will be at this year's Electrical Engineers Exhibition (ASEE) on Stand 005 and a comprehensive range will be shown.

These pressure sensitive tapes include Lasso Nos. 87, 91, 92 and 96, P.V.C. tapes and Lasso Nos. 16, 18, 19 Polythene tapes. The range of tapes covers all needs for insulating coils, bus bars, leads, cable-ends, and cable harnesses. They also provide a "stopping off" medium in electro-plating, separators for dissimilar metals, anti-corrosion raps for conduits and colour coding for circuit identification.

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shown but the section on view incorporates the control cubicles for two of the 800 kW alternators, a distribution section with switch fuses and circuit breakers and a motor starter section with draw-out type contactor starters.

Wiring developments

Simplex will introduce two new wiring advances and give Electricaire its first national showing.

One of the wiring developments is a range of custom-designed steel conduit, cut to length and delivered to site with all accessories, junction boxes, outlet and switch boxes to match the layout of each room. The second innovation is pre-cut, pre-wired pvc flexible conduit harness of especial interest for industrialized and system-built projects.

The Creda Electricaire off-peak, warm-air storage heating system will be shown in sectioned form to underline the compact construction, and a graphic amination will demonstrate the principle of air circulation. The storage unit measures only 4ft. 10in. high on a 12in. square plenum.

Induction motors

The wide variety of units to be shown by Fractional HP Motors Ltd., includes two important additions to the Company's existing range. These are a new model in the Type 33 series of commutator and induction motors, and the first 'Fracmo' flat-sided motor.

The new Type 33 has been designed not only to give an output some 25 per cent higher than that of the Company's existing models in this range, but to achieve this output from a unit of reduced size and weight. The ventilation has also been re-designed to give improved cooling.

Pam motors

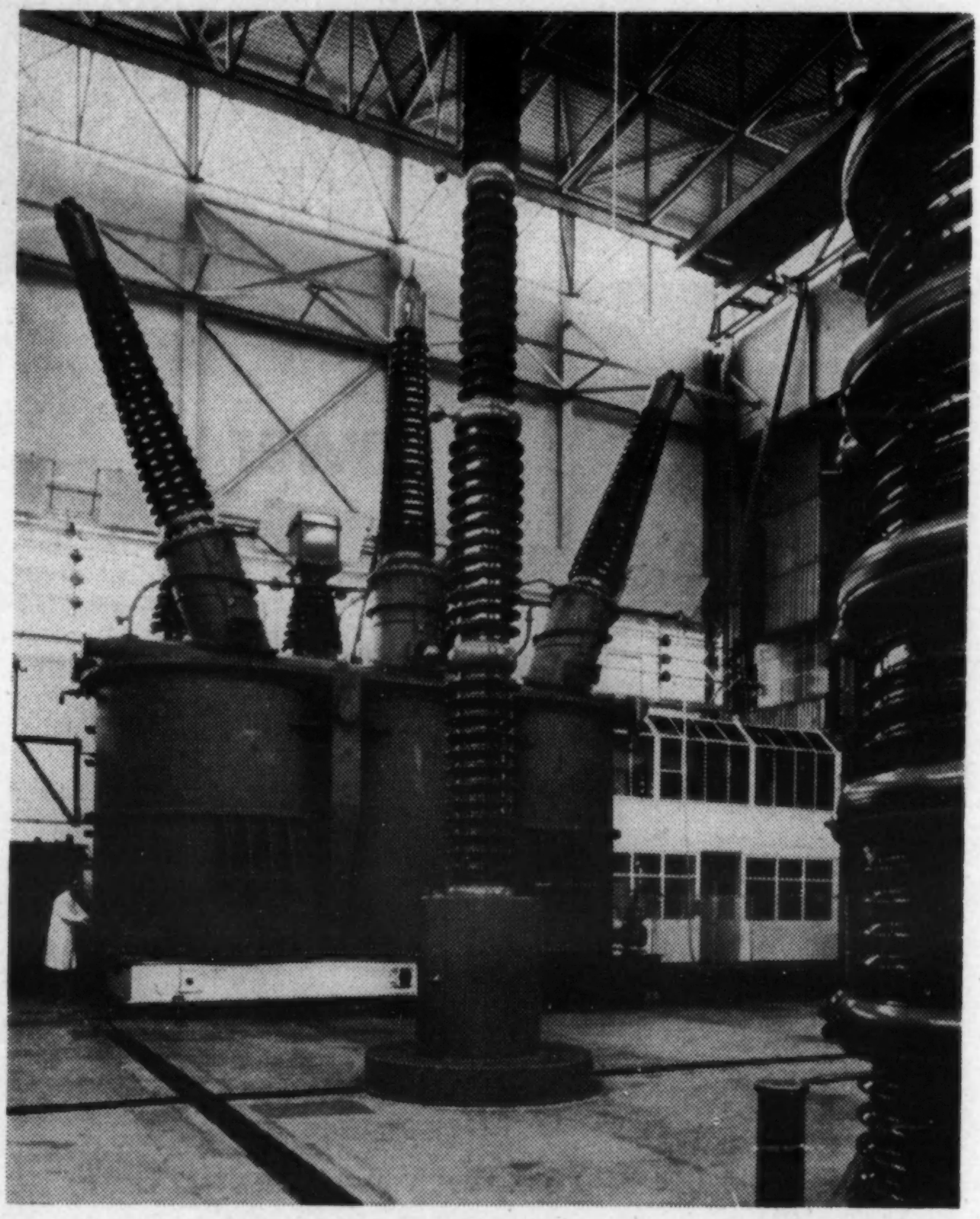
W. Mackie & Co. Ltd., will be exhibiting a wide range of their products which will include a range of p.a.m. motors. Mackie have a licence to manufacture p.a.m. motors, and are introducing 18 frame sizes to cover the range from ⅛ h.p. to 50 h.p. at the 3000 r.p.m. rating. The motors which will be made available initially are for 3 phase 50 or 60 cycles supply, and will normally provide up to three speed ratios selected to suit the customers requirements.

The firm will also be demonstrating a new solid state stepless control for lighting and domestic power applications up to 500 watts. This unit is suitable for controlling the speed of motor operated domestic appliances such as sewing machines, vacuum cleaners, food mixers, and power drills.

Industrial and domestic equipment

GEC (Engineering) Limited is one of nine subsidiary and associated companies of The General Electric Company Limited whose products will be displayed. The whole stand will be devoted to industrial and domestic electrical equipment of interest to consultants, architects, works engineers, contractors and wholesalers, and the products to be displayed by GEC (Engineering) Limited will therefore represent its activities in the light-current field rather than in heavy electrical engineering.

Special vertical pump motors being assembled at the Yate, Bristol, works of Newman Industries Ltd. They are part of a large order received by the firm from a German pump manufacturer and will be used on irrigation projects in Turkey. The order is the latest in a series recently won by Newman from the German firm against keen international competition.



All power frequency and impulse voltage tests have been completed on a 400 kV super grid auto-transformer for the CEGB sub-station at Cowley (Oxford). This unit is the first of 14 400 kV transformers being manufactured by Hackbridge and Hewittic Electric Co. for the Board, and an identical winding arrangement in prototype form has been previously proved at a high voltage terminal impulse level exceeding 2 megavolts.

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